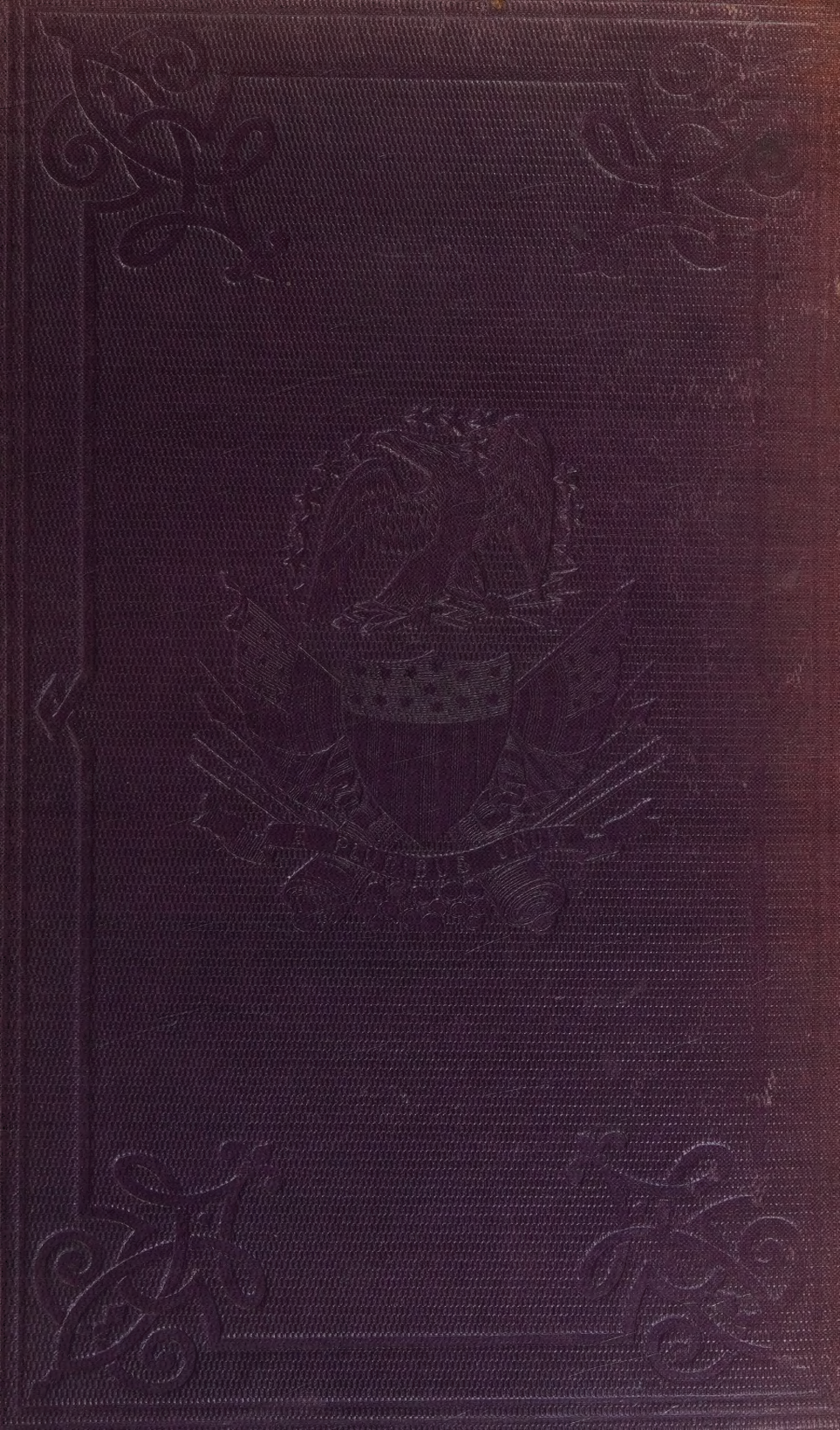

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REPORT

OF THE

COMMISSIONER OF PATENTS

FOR THE YEAR 1851.

PART II.
AGRICULTURE.

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VII. METEOROLOGICAL TABLES.
VIII. MISCELLANEOUS.

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1852.

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LETTER

OF THE

COMMISSIONER OF PATENTS,

COMMUNICATING

The Agricultural portion of the Report of that Office for the year 1851.

MAY 3, 1852.—Laid upon the table and ordered to be printed.

AUGUST 30, 1852.—Ordered that 100,000 extra copies be printed.

AUGUST 31, 1852.—Ordered that 10,000 copies extra be printed for the use of the Patent Office.

PATENT OFFICE,
April 23, 1852.

SIR: I have the honor to submit, herewith, the Agricultural portion of the Report of this Office for the year 1851, and respectfully request you to lay it before the Senate.

In view of the rapid destruction and threatened extermination of the principal indigenous ruminants of the continent, a paper has been prepared, at my request, by Professor S. F. Baird, of the Smithsonian Institution, to show their susceptibility of domestication, and that duty requires us, instead of wantonly destroying, to preserve and multiply these noble denizens of our forests and plains, both because of the great interest attached to them by the naturalist, and of the value of some of them as laborers, and all of them as furnishing materials for manufactures and for food.

Very respectfully, your obedient servant,

THOMAS EWBANK.

Hon. LINN BOYD,
Speaker of the House of Representatives.

I.

AGRICULTURE AND AGRICULTURAL EDUCATION,

INTRODUCTION.

In submitting this portion of the annual Report, it is gratifying to note that the interest in agriculture, and the improvements in this most vital of the arts, keep pace with the progress of the age in other respects. In our widely-extended country, embracing a range of climate and diversity of soil which enable us to produce almost every article of consumption, it seems to be peculiarly the province of the government to contribute all the aid in its power for the advancement of agriculture by the collection and diffusion of useful information on the subject. Those who are engaged in the culture of the earth are proverbially cautious of innovation; but where new and better paths have been long explored by science, and found to be safe by experience, they are never neglected.

Chemistry, the handmaid of all the sciences, has within a few years past contributed largely to the development of agricultural resources; and in most of the agricultural schools which have been established a competent knowledge of this subject is made the basis of education. In this conjunction of science with what was once supposed to require little beyond mere physical labor are pre-eminently involved the present prosperity and future advancement of nations.

If the government continue to collect the varied information comprised in the statistics of the recent Census, it will be highly instructive to note the increase of agricultural products to the acre in those sections of the country where the fostering rays of science have lent their aid to the culture of the soil. In this respect it must be admitted that we are far behind some portions of the Old World; nor is it remarkable that this should be so. Men crowded together upon a small area of land are compelled by stern necessity to make the most of their limited means; and where hunger is the schoolmaster, the lessons taught are not apt to be soon forgotten. With us a condition of things precisely the reverse exists. The possession of too much land has hitherto induced a careless and slovenly system of husbandry, from the effects of which in many of the earliest settled parts of our country we are but now beginning to recover. Some of the new practices introduced abroad are not applicable to the same extent, on account of the difference in soil and climate, and also in the price of labor. The great feature of modern

improvement in England, which has added immensely to the value of lands in that country, and is destined in all probability to quadruple the products of the kingdom, is one which might be introduced into our country to a limited degree with great advantage: this consists in an extended system of *drainage*. In the moist climate of Great Britain this practice of under-draining, as it is there called, (for the drains are constructed of manufactured tiles, and covered,) embraces all lands, both high and low, and has been followed by astonishing results. The philosophy of draining consists in this: that it gives the cultivator command of the water by which his soil is affected; enabling him to use the redundancy in one case to supply deficiency in another. Too much water, whether it comes from excessive rain or permanent springs in the soil, is pernicious to cultivation: true, under certain conditions, it may even cause a greater luxuriance of vegetation; but, as a general rule, the plants produced in a wet soil are not so nutritious and valuable. It is stated in some reports on English agriculture by the late Rev. Henry Colman, of Masssachusetts, that the Duke of Portland, as far back as 1846, had completed more than seven thousand miles of drainage on his estates. Another proprietor made two hundred and fifty miles yearly; and a third had completed the drainage of four hundred and sixty-seven acres at an expense of more than £1,500, and had increased the rental of his land by these operations to the amount of £435 2*s.* 4*d.*, or at the rate of 29 per cent. upon the capital expended. To mention but one of the many instances of profit from this source adduced by Mr. Colman, a farmer made upon wet land two hundred bushels of potatoes per acre; the product of the same land after it had been drained was six hundred and ten bushels per acre.

Not less surprising in its results is that comparatively new and wonderful fertilizer known under the name of *guano*. The beneficial effects it produces have excited attention to its value throughout the country; and the portable manner in which it is prepared, with the facilities of its transportation, lead us to hope that for the time to come its consumption will be greatly increased. In the last Report of this Office, certain statements in reference to its qualities and value were given on the authority of Hon. Willoughby Newton, formerly a member of Congress from Virginia. Mr. Newton's experience has been confirmed by every one, so far as we can learn, who has applied it judiciously and under favorable circumstances. There are two principal kinds of guano imported into the United States, viz. African and Peruvian; the latter being much the more valuable, and commanding nearly double the price of the former. It is sold at prices ranging from $25 to $45 per ton, the former being the price of the inferior or African variety. It is sown broadcast upon the land, at the rate of from three to four hundred pounds to the acre, and ploughed in to the depth of four or five inches, the land having been previously broken up. So powerful is the stimulant, that on some lands four hundred pounds to the acre would be an unsafe application; although a smaller quantity than two hundred pounds, where the land is not already fertile, produces but little effect. The most general application of it hitherto has been for the growth of wheat and clover, although it has been succesfully used in the culture of root crops and the fertilizing of ornamental grounds. It is commonly mixed with gypsum or plaster, in the proportion of one

third of plaster to two thirds of guano, the plaster serving to fix the volatile parts of the guano as well as to neutralize its caustic properties. It may be less durable in its effects than many other fertilizers, but there is probably no known substance which will produce such large returns with so little outlay of labor and capital as guano. The use of this article has been increasing in England for years past, and the demands for it have led to inquiries which may result in finding deposites of the material in other localities than the few now known. The following annual returns, with the first two quarters of the present year, furnished by the Treasury Department, will show that its use is gaining ground here :

Exhibit of the quantity and value of guano imported during the years ending 30th June 1848, 1849, 1850, and 1851, and also from the 1st of July to the 31st of December, 1851, being the 1st and 2d quarters of the commercial year 1852.

GUANO IMPORTED.

	Tons.	Value.
1848	1,013	$20,839
1849	21,243	102,274
1850	11,740	91,948
1851	23,153	97,851
1st and 2d quarters of 1852	23,353	76,799

From the foregoing it will appear that the importations of the two last quarters exceed the entire amount of any previous year.

In a subsequent part of this Report will be found agricultural statistics collected in taking the late census.

AGRICULTURE IN CALIFORNIA.

An address delivered by A. Williams, Esq., at a meeting in San Francisco, for presenting the premium of a silver goblet, offered by Mr. C. A. Shelton for the best varieties of vegetables and grains, contains some interesting particulars of the agricultural resources of California.

Mr. Williams says that California is a State whose agricultural capabilities—a far richer treasure than her mineral wealth—are unsurpassed in any portion of the earth, and whose variety of useful products are equalled only by their unparalleled extent and adaptation to the varied wants of man. In most of the others, a single excellence is characteristic and predominant. The lumber of Maine, the granite of New Hampshire, the wool of Vermont, the manufactures of Massachusetts, the agriculture of New York, the coal and iron of Pennsylvania, the grain and fruits of the middle and western States, the copper of Michigan, the corn, tobacco, and hemp of Virginia and Kentucky, the cotton of Alabama and Georgia, the sugar of Louisiana, the sugar, cotton, and indigo of Texas, the turpentine of North, and the rice of South Carolina,

constitute, respectively, their most prominent and distinctive interests, and are the pride and glory of their citizens. But there is scarcely one of these that cannot be found or produced in our own State. In the natural productions of the earth conducive to the sustenance of man, is our State abundantly prolific. As we approach the centre of the State, the banana, the orange, the lemon, the olive, the fig, the plantain, the nectarine, the almond, the apricot, and the pomegranate of the South, mingle in the same luxuriant gardens of Los Angeles with the peach, the pear, the cherry, the plumb, the quince, and the apple of the North; the fruits of the oak and the pine, of gigantic size and delicious taste, furnishing to man and beast the richest and most nutricious food; the beautiful salmon of the noble Sacramento, often weighing thirty, forty, and even sixty pounds, vieing with any other in fineness of texture and richness of flavor, as well as in size; and one uncommon article of fine white sugar, the exudation of a species of pine tree called the sugar pine; the successive ranges of mountains, whose extent is lost to view in the distance, waving with rich harvests of oats, the spontaneous production of the soil; solid trees of the red-wood, on the banks of the Trinity and Shasta rivers, sixty-eight feet in circumference; hollow ones, whose cavity has sheltered sixteen men and twenty mules for the night; pines crowning the dizzy peaks of the Sierra Nevada three hundred and eighty feet in heigth, the first two hundred and fifty feet without a branch or limb, an extent of growth so far beyond the ordinary size as to seem almost incredible, but well known, and seen, and verified by the uniform and concurrent testimony of many whom I see sitting around me. And we have some still larger and taller specimens of other things nearer home, here in our own city, to which many who hear me will bear witness from experience, and which come to maturity "*monthly in advance*"—rents, the tallest kind of rents, put up higher than the pines, and sometimes harder to get around than red-wood! I hold in my hand a statement signed by twelve citizens of the county of Santa Cruz, Messrs. McLean, Gibson, Mallison, Peck, Clements, Pedriet, Mills, Stevens, McHenry, Sanborn, Kista, and Loveland, gentlemen of unquestionable veracity, an extract from which is as follows:

"On land owned and cultivated by Mr. James Williams, an onion grew to the enormous weight of twenty-one pounds. On this same land a turnip was grown which equalled exactly in size the top of a flour barrel. On land owned and cultivated by Thomas Fallen, a cabbage grew which measured, while growing, 13 feet 6 inches around its body. The weight is not known. The various cereal grains also grow to a height of from six to twelve feet. One red-wood tree in the valley, known as Frémont's tree, measures over fifty feet in circumference, and is nearly three hundred feet high."

Added to these astonishing productions is a beet, grown by Mr. Isaac Brannan, at San José, weighing sixty three pounds; carrots, three feet in length, weighing forty pounds. At Stockton a turnip weighed one hundred pounds. In the latter city, at a dinner for twelve persons, of a single potato, larger than the size of an ordinary hat, all partook, leaving at least the half untouched. These may be superlatives, but they do exist, and they show what our soil and climate are capable of producing. Nor are these more seemingly incredible than the well-known fact of a portion of our State, nearly six hundred miles in length, and

fifty in breadth, whose every foot of land from hill top to valley is more or less impregnated with gold of every conceivable form and size, from dust up to lumps weighing thirty pounds. But let us cast our eyes around this hall, and what do we see even from this hasty collection and casual contribution—an agricultural, botanical, geological, mineral, and floral exhibition, embracing nearly one thousand varieties of pressed flowers of every hue and of surpassing brilliancy, nearly two hundred varieties of which are illustrated by truthful and beautiful drawings; seeds of more than three hundred varieties of native flowers; twenty varieties of lily and other bulbous roots, embracing the remarkable soap plant, rivalling the finest boasts of the toilet, and adding to it its healing qualities, as if provided by Nature for the double purpose of sanitary and abluent properties for the native sons of the forest; specimens of one thousand varieties of the principal quartz veins and soils of the State; about twenty varieties of the principal grasses and clovers, many of the specimens pressed, embracing the burr clover, that feeds to fatness the "cattle of a thousand hills" when all other sustenance is parched and withered; Shelton's mammoth clover, whose stalks from one root covered an area of eighty-one square feet, some of the stalks six feet long, a half-inch in diameter, and the clover head five inches in circumference; single stalks of the white lily, producing one hundred flowers of indescribable delicacy and beauty; beautiful specimens of minerals and pressed flowers from H. Pratten, esq., of Nevada; stalks of the oat gathered by Mr. Shelton, thirteen feet high; specimens of wheat and barley having one hundred and fifty and two hundred mammoth stalks springing from one root, the produce of a single seed; the red sugar-beet grown by Mr. L. M. Beard, of San José, twenty-eight inches in circumference, and weighing forty seven pounds—some from the luxuriant gardens of Alderman Green, of this city, of only two months' growth, weighing six and seven pounds; a cabbage from H. Bolmer's ranch, mission of San José, weighing fifty-six pounds, and measuring seven feet in circumference, presented by Wilson & Co.; cucumbers raised by the same, eighteen inches in length; onions cultivated by Messrs. Smith and Broder, and contributed by Messrs. Chamberlain and Musser, five, six, and seven inches in diameter, and weighing three and four pounds each, nearly seventy thousand pounds to an acre, and the whole number from the acre supposed to average one pound each; potatoes from Mr. H. Speel, of Santa Cruz, one hundred and twenty pounds from five vines of a single hill—one from Mr. B. J. Stevens, of Santa Clara, thirteen inches in length, twenty-seven inches in circumference, and weighing seven and a quarter pounds; the Russian bald barley, grown by Mr. Johnson on his ranch, upon the banks of Bear river, weighing sixty-six pounds to the bushel, with a kernel near double the size of large wheat; raspberries five inches in circumference; of barley from the San José valley, nine hundred and sixty-five bushels were produced from less than five acres of land—some from the farm of Madame Scoofy, of Sonora, where twelve acres, by ordinary cultivation, produced a crop of fifty-three thousand pounds. These walls are festooned with luscious grape from Capt. Malstry, of Los Angeles, single bunches from the gardens of Gen. Vallejo, at Sonoma, weighing ten pounds; apples, peaches, figs, and other fruits of enormous size from the same; from Horner, tomatoes

weighing two pounds each; pumpkins and squashes one hundred to one hundred and forty pounds each; cabbages two feet in diameter, and weighing over fifty pounds; onions, beets, and potatoes of enormous size, not isolated, but by hundreds of bushels; the top onion produced the first season from the ordinary seed, with samples of wheat and barley of uncommon size and weight; and added to the exhibition are also beautiful specimens of the Daguerrian and photographic art from Mr. Shew, and also from Mr. Bradley; lemon syrup of exceeding excellence, manufactured and exhibited by Messrs. Street & Co., of this city; exquisite feather work, by Madame Paacard; besides samples and specimens of countless varieties of plants, herbs, vines, fruits, grains and esculents of exceeding size and singular perfection, collected by Mr. Shelton, to the enumeration of which the proper extent of this address is wholly inadequate. Among the tropical productions introduced by him are coffee, ginger, banana, plaintain, and pomegranate, which are now in progress of successful cultivation; and he has this day received from Valparaiso a choice assortment of rare and valuable exotics—the entire stock of a greenhouse, embracing two thousand of the choicest French and Italian grape vines, fifty varieties choice pear trees, six varieties plums, three of apricots, twenty of peaches, five of currants, and seven thousand asparagus plants. Of flowers there are fifty varieties of jessamines, four of the African hibiscus, eight of chrysanthemums, twelve of althea, the wax plant, pinks, cacti, eighty-four dahlias, and over one thousand rose bushes. I have recently been informed by one of our adopted Celestials, whose phrenological developments of "*auri sacra fames*" predominated over his "*amor patriæ*," that our soil, climate, and seasons are well adapted to the growth of the tea plant, and that, as there existed no natural obstacle to its successful cultivation here, he had sent to China for seed, and intends to commence growing it in the ensuing spring.

Indeed, there is scarcely a fruit or a plant, a shrub or a flower, a mineral or a vegetable, of which any land can boast, but what is embraced within the limits of California, a "bright particular star" in the constellation of States, the crowning gem in the tiara of freedom. It needs but encouragement to develop her exhaustless resources. Agriculture is the greatest and most important, as it is the first, occupation of man. Manufactures, arts, sciences, commerce, inventions, all follow in her train. It is for the purpose of encouragement to the farming, as well as the horticultural, interests that we have here assembled; and this silver goblet, equally creditable to him who gives and to him who receives, I am requested by Mr. Shelton, the giver, to present to you, Mr. Horner, as a premium for the best variety of vegetables and grains, and as a testimonial of his and our and the public appreciation of your persevering and successful efforts here in the great and noble field of agricultural and horticultural industry. In your case we have seen, while the public mind was absorbed by the irresistible maelstrom of the gold mania, a single individual in four years even more successful in developing the agricultural, than others the mineral, wealth which slumbers in the bosom of our soil, under peculiar disadvantages, from want of proper implements, proper seeds, and sufficient manual help—at first aided by the labor of only three natives of the forest, till the teeming soil, in grateful return for her cultivation, yielded her riches, in the fifth year enabling you

the present season, with the average aid of 60 co-laborers, to realize from 800 acres of land in the Santa Clara valley, of—

Potatoes	120,000	bushels.
Onions	6,000	"
Table beets	4,000	"
Turnips	3,000	"
Tomatoes	1,200	"
Barley	5,000	"
Pumpkins	20	tons.
Solid-headed cabbage	108,000	
Chickens	600	
Eggs	1,200	dozen.
Onion seeds	800	pounds.
Beet seed	200	"
Cabbage seed	100	"

And thus, at a cost of about $50,000, producing a crop worth, at present prices, some $200,000.

THE MINERAL MANURE THEORY.

ANALYTICAL LABORATORY, YALE COLLEGE,
New Haven, Connecticut, October 24, 1851.

EDS. CULTIVATOR.—The subject which I have placed at the head of this letter is not one which can be fully discussed in a single page of your journal; and yet it is one of so much importance, that I desire to make a few explanations and statements regarding the shape which it has now assumed among scientific men. When I mention the "mineral manure theory," I speak of that view of manures which ascribes all, or nearly all, of their efficacy to their mineral constituents. The principal supporter, and, indeed, the originator, of the theory, is Professor Liebig. This distinguished chemist, distinguished no less by his clear and lucid style than by his high scientific reputation, was for a time devoted to the "ammonia theory," excluding those mineral manures to which he now attaches so much importance. A few years since, however, he saw cause to change his ground, and has since held that, if we furnish mineral manures in abundance, plants will, without doubt, always obtain their ammonia, or rather nitrogen, from the atmosphere or the soil.

In pursuance of this idea, he went so far as to compound, after a careful study of ash analyses, specific mineral manures for wheat, rye, oats, turnips, &c., which were to take effect upon all soils in a proper physical condition. The failure of these specific manures, which were patented in England, was, as many of your readers doubtless are aware, very decisive. I had supposed the subject rather at rest, but find that, in the last edition of Professor Liebig's "Letters on Chemistry," pub-

lished so late as the commencement of the present year, he reiterates his former views on this subject in a most decisive manner, and prophesies that our future agriculture will depend upon them, however much we may distrust and disbelieve them now. I have also had occasion to observe quite recently that some gentlemen of high standing among our scientific men follow Liebig in this as well as in other theories. For these reasons I have thought it best to express my own opinions on this contested point, in order that our farmers may be aware that all chemists do not hold to views which militate almost directly against the ordinary results of practice.

My belief was that, when Professor Liebig advocated the "ammonia theory," he was nearer right than he is now, when he only admits the necessity of mineral manure; not that he was right then, but that better results would, in most cases, be obtained by the farmer in the use of ammoniacal or nitrogenous manures alone than by the use of mineral manures alone. We find land in all parts of the country where strictly mineral applications, such as lime, plaster, marl, &c., fail to produce any marked effect; but if upon any of our fields we apply guano, or sulphate, or carbonate of ammonia, the character of the vegetation is at once changed, its color alters, its luxuriance and vigor increase, and in a great majority of cases the product is augmented. Every farmer who has observed matters intelligently knows that the above statements are correct; indeed, they have been so far applied in practice, that the quantity of ammonia which any manure contains is taken as the highest standard of its value. A guano, for instance, with the usual per centage of ammonia, will bring twice as much as one which contains little ammonia, even though this deficiency is replaced by the most valuable possible mineral constituents. I must not be understood to say that mineral manures are not valuable; on the contrary, I have the highest opinion of them, and recommend their application in almost all cases where my advice is asked. The mineral constituents of the plant are no less indispensable than its organic part, and if one or two of them are absent from the soil, the plant will not flourish. There are many instances of these special deficiencies, which special mineral manures alone will supply, and there are certain mineral substances which have been found specially valuable. The most valuable of all these is phosphoric acid. Now, the *phosphates*—that is, the compounds of this acid—are not more necessary to the plant than are the *alkalies*, but the supply is far more apt to be scanty; and this—not its intrinsic importance to the plant—is the cause of its higher value to the farmer. The same principle applies when we say that nitrogenous manures, of which ammonia is the most common form, are more valuable than others known in agriculture. They are volatile, easily decomposable, and very soluble; for all of these reasons, they are extremely apt to disappear most rapidly. These manures, then, are worth more to the farmer than any others, because they are most likely to be needed, and because their scarcity renders it somewhat difficult to obtain a good supply.

I make these statements fearlessly and confidently, although against so high an authority as Liebeg. I should not presume to differ from him on mere theoretical grounds, but feel that I am here sustained by almost uniform practical results. It must be acknowledged that we have occasional instances reported of plants grown upon soils nearly or quite des-

titute of vegetable matter; but in most of these that have fallen under my observation, the fact of the *entire absence* of vegetable, and particularly of nitrogenous matter, has not been sufficiently established. The information that they give is neither entirely definite, nor well enough made out, by continuous and careful experiments, to be set off against an array of facts brought forward in favor of the opposite view. Single experiments, for a single year, must always be looked upon with distrust until amply verified; and it is by mainly trusting to such, so far as we are informed, that the exclusive mineral theory has been built up. The laboratory alone is pretty sure to go wrong when it attempts to prescribe rules for practice. The chemist must go into the field and study actual experience if he would serve the farmer effectually. It has been my intention to experiment somewhat largely upon this particular subject; but in the last number of the Journal of the Royal Agricultural Society of England is a paper of Messrs. Lawes and Gilbert, that almost precludes the necessity of doing anything more. These gentlemen have been experimenting on a large scale for the last ten years, and their results are clearly and admirably set forth. They took a field at the close of a four years' rotation, when the manures added at the commencement of the course were exhausted. On this ground they have cultivated wheat for ten years under various conditions. One plot remained unmanured, and the produce of this served as a standard and a starting point for comparison during the whole period. Thus, if its yield in 1845 was seventeen bushels per acre, the improvement over this in an adjoining plot, otherwise the same, was set down to the advantage of whatever manure had been employed. Such a system of cropping, continued for so long a time, obviously affords results that are worthy of much confidence. The first year's comparative practice was made with various approved mineral manures alone. It was found that, even by the addition of large quantities of these, the increase of product over the unmanured plot was but trifling. In the next year the same character of mineral manures were employed, but with the addition in several cases of ammoniacal or nitrogenous substances. In all of these the effect was quite marked, the yield increasing to ten, twelve, and fourteen bushels, above the unmanured plot. This, in short, was the character of all the results; sometimes ammoniacal manures alone were added, and then the increase was several times more than by mineral manures alone. One experiment was very striking: four hundred weight per acre of Liebig's special mineral manure, for wheat, was applied to a plot, and produced an increase of but about two or three bushels upon this same plot in the next year. A purely ammoniacal manure gave an increase of ten or twelve bushels. To make the experiment still more conclusive, no manure was added to this plot for the next crop, and the yield then fell again almost to the original standard.

These trials seem to me perfectly conclusive in this matter, so far as wheat is concerned; they prove that ammonical manures increase its growth far more than mineral manures, where both are already present in moderate supply, and that the addition of any amount of the latter will do little good unless the former be also present. These views are still further sustained by a very able paper in one of the late French scientific journals. The experiments in this case were made upon oats, and were between forty and fifty in number. They commenced by growing them out in sand, first deprived of every thing soluble by acid, and then burned

to draw off all vegetable matter. In this, as might have been expected, no perfect plants were produced. One mineral substance after another was added, until at last it was found that, with a certain *series* of them, the plant flourished better than with any others. It, however, was still far from luxuriant, or from yielding a fair amount of grain. It was not until some manures containing nitrogen had also been added that entirely healthy, fertile, and strong plants were obtained. These experiments appear to have been very carefully conducted, and furnish important confirmation to those of Messrs. Lawes and Gilbert.

There are other questions involved in these experiments, which for want of space cannot be discussed here. The main point is, I think, fully established. The farmer may supply special deficiencies by special mineral manures, and should aim to keep up the supply of mineral substances in the soil; but he cannot render it fertile, and continue it so, with them alone; he must also supply nitrogen in some form, and will find it in a great majority of cases the most important and efficacious of all fertilizers. In despite of *theoretical* views to the contrary, he will find that, in *practice*, he can best afford to give a high price for those manures—that, especially, rich in ammonia or some other compound of nitrogen.

Yours, very truly,

JOHN P. NORTON,
Albany Cultivator.

EXPERIMENTS WITH PERUVIAN GUANO AND BARN COMPOST.

NEW YORK, *November* 12, 1851,

DEAR SIR: I send you, herewith, a number of the "New England Farmer," (March 1, 1851,) containing an account of some experiments with Peruvian guano and barn compost, to which I beg leave to invite your attention. These experiments were made by my father, Josiah Keene, at his farm in Rhode Island. Much care was bestowed on them; and their design was to furnish data to estimate the relative value of these fertilizers. I think the positive information they furnish much exceeds that of the great body of agricultural papers. I have not seen any experiments on guano of so much positive value.

Yours, respectfully,

S. S. KEENE, *M. D.*

HON. THOMAS EWBANK.

[From the New England Farmer.]

MR. COLE: Having several years ago experimented with guano, (of such quality as could then be procured,) with results unfavorable to the article as a fertilizer, it was with little faith, and that founded principally upon the great reputation of Peruvian guano, that we undertook the following experiments:

The guano employed on this occasion was obtained directly from Peter Harmony Nephews, of New York, Peruvian government agent for the sale of it. We were thus satisfied of its genuineness. The experiments were conducted with care, and their results much surprised us. One part Peruvian guano and three parts of dry loam constituted the guano compost mentioned below.

First experiment.

On the 1st of September, 1849, upon land in good tilth, we sowed rye broadcast, (intended for soiling in the spring,) at the rate of three bushels to the acre. The 1st of April following, its appearance was unpromising and sickly, insomuch that we feared it might prove a failure.

April 8, 1850.—We applied to a portion of the field guano compost, at the rate of three hundred and twenty pounds of guano (value seven dollars) to the acre. The ground was moist, the snow having just disappeared. In a few days the beneficial effects of the guano were manifest, those portions of the field to which it had been applied becoming greenest, tallest, and thickest; which characteristic they maintained to the end of the season.

May 28.—We cut green one square rod of guanoed rye, and another square rod of unguanoed, lying side by side, and weighed them carefully.

Weight of guanoed square rod - - -	105 pounds.
Do. unguanoed do - - -	60 "
Return for guano applied, per rod - -	45 " being

a gain of more than two-thirds.

July 23.—We reaped at maturity one square rod of guanoed rye, and the same of unguanoed, side by side, and weighed the bundles.

Weight of guanoed bundles - - -	44 pounds.
Do. unguanoed do. - - -	35 "
Gain for guano - - -	9 "

In September we threshed these bundles and weighed the grain.

Weight of guanoed grain - - -	16 pounds.
Do. unguanoed do. - - -	10 "
Gain in grains, per rod - -	6 "

A gain of six pounds of grain in one rod is equal to sixteen bushels to the acre, calculating fifty-eight pounds to the bushel. Valuing rye at eighty cents a bushel, these sixteen bushels are worth twelve dollars and eighty cents. Valuing rye straw at seven dollars a ton, the three pounds per rod, (see difference between six and nine in the two tables above,) or four hundred and eighty pounds per acre, are worth $1 50.

Thus we have—

Value of sixteen bushels of rye - - - -	$12 80
Do four hundred and eighty pounds of straw - -	1 50
Return for seven dollars' worth of guano - - -	14 30

Second experiment.

This was made on grass. The land had not been ploughed for many years, nor manured for three years, but was moderately fertile.

April 1, 1850.—We applied the guano compost to a portion of this grass, at the rate of three hundred and twenty pounds of guano (value seven dollars) to the acre. Alongside, at the same time, we top-dressed another portion with barn compost, (cow droppings and dry peat, equal parts, well composted in the barn,) in the proportion of sixteen loads to the acre, valued at $1 50 per load, or twenty-four dollars for the sixteen loads. The grass on the guanoed portion soon surpassed that on the top-dressed portion in verdure, became tallest and thickest, and remained so until mowed.

July 14.—We mowed a square rod of each of these portions, side by side, and on the 16th weighed the products. They were only two-thirds dry, owing to wet weather.

Weight of guanoed rod - - - -	62 pounds.
Do. top-dressed - - - -	42 "
Gain by guano in one rod - - -	20 "

Nearly fifty per cent. greater yield per acre with seven dollars' worth of guano than with twenty-four dollars' worth of barn compost. The aftermath was also greenest and thickest on the guanoed portion.

Third experiment.

This was also made on grass. Land rather light and dry. It had been stocked to grass four years, and had not been manured for three years.

April 11, 1850.—We applied guano compost (three hundred and twenty pounds, or seven dollars' worth of guano, to the acre) during a light fall of snow.

July 16.—Mowed two square rods, side by side, (one had been guanoed—to the other nothing had been applied,) and weighed them green.

Weight of guanoed rod - - - -	60 pounds.
Do. unguanoed - - - -	32 "
Gain by guano per rod - - -	28 "

Nearly one hundred per cent. gain. Aftermath green and thick.

Fourth experiment.

This was also on grass. A border of low meadow, which had been valueless, was ploughed in 1848, and sowed down to grass the 1st of September, 1849. Before sowing down, gravel had been scattered upon the surface, and barn compost, at the rate of thirty loads to the acre, had been spread and harrowed in.

April 12, 1850.—Applied guano compost (three hundred and twenty pounds of guano to the acre) to a portion of this border.

July 22.—Mowed two square rods, side by side, and weighed green grass moist with dew.

Weight of guanoed rod - - - -	115 pounds.
Do. unguanoed - - - -	62 "
Gain by guano, per rod - - - -	53 "

Nearly one hundred per cent. The straw was fine on the guanoed portion, and the aftermath much the heaviest, some of the herds' grass coming to maturity the second time.

Fifth experiment.

This was made on Indian corn for soiling. Land in good tilth.

June 6, 1850.—We ploughed under the whole field barn compost, at the rate of thirty loads to the acre, and harrowed deep.

June 8.—Furrowed deep for planting corn in drills. Into a portion of the furrows we dropped barn compost, at the rate of six loads to the acre (value nine dollars); we then dropped southern corn, at the rate of two and a half bushels to the acre, and covered. Into another portion of the furrows we strewed guano compost, (three hundred and twenty pounds of guano per acre,) covered it lightly with earth, then dropped southern corn, at the same rate as above, and covered.

June 16.—The guanoed rows were well up—the manured rows scarcely visible. During the whole season the guanoed rows kept the lead and excelled the manured rows in verdure, height, and size of stalks.

Two heavy gales of wind in July prostrated the whole field. The guanoed portions were the most injured; and about the middle of August, before the stalks had attained their full size, we were obliged to cut them. We weighed (green) a square rod of each of the rows, side by side.

Weight of square rod of guanoed rows - -	450 pounds.
Weight of manured - - - - -	365 "
Gain for guano per rod - - -	85 "

Several other similar experiments were made, some of which showed even more surprisingly the effects of guano; but these are the only ones sufficiently complete to publish. They all confirm the great reputation of Peruvian guano. The value of this substance, compared with other fertilizers, cannot at present be determined; but it may be considered the cheapest in use.

President Fillmore, in his late message to Congress, draws the attention of that body to the Peruvian guano trade, as a subject of importance to American agriculture.

The annual consumption in the United States is fifteen thousand tons: the demand principally for the middle States. Many worn-out plantations in that section have been made productive by Peruvian guano.

Were this agent to be more extensively employed in New England, it no doubt would yield abundant returns, for it is peculiarly qualified to fertilize her cold and exhausted soil. If Peruvian guano has failed in some hands, it has arisen probably from want of knowledge or care in the use of it. It is also notorious that spurious and worthless

articles are sold for Peruvian guano. These experiments will be continued, and their results communicated to the public.

JOSIAH KEENE.

North Providence, R. I., *February*, 1851.

Remarks.—We have accounts of various results from the use of guano. In some cases it has been highly profitable; in others it has produced no perceptible effect. As suggested by our correspondent, we have no doubt that guano has often been used injudiciously, and often a spurious kind has been obtained; for a great deal of guano sold is adulterated. In addition to these principal causes of failure, the season is sometimes unfavorable from drought; and occasionally there is a want of adaptation of the manure to the soil and crop.

We trust that some cultivators will persevere in their experiments until the use of guano is reduced to a system, and its just value ascertained; for it is highly desirable that we have our resources for fertilizers enlarged, and that we have some manures that can be had in abundance, and are profitable, so as to be convenient in transportation and application. We advise experimenters on guano to be particular, and note the exact results, as Mr. Keene has done. Let us have something more than vague guessing.

WELL-DIGGING.

Prairie du Chien, Wis., *January* 1, 1852.

Dear Sir: Your Agricultural Circular was duly received, but I have been unable to take the necessary time to reply until now; and even now I must confine my remarks to but one topic—that is, *well-digging*. There is, however, no one subject of more importance to the farmer who has not living, running water on the surface; and no part of the operation is of more intrinsic importance than that of ascertaining where to dig, which will be the chief topic of consideration in this communication.

I am aware of the difficulty of convincing some men that things may be *facts*, which they cannot understand the why and wherefore of, or comprehend the reason for. And I know as well that the same skepticism would exist as to their own existence, and as to a thousand other facts, the reason for which we do not comprehend any better, or more clearly, than that in reference to finding water under ground; but because they are common, and of every-day occurrence, we never think of the why and the wherefore of their existence. They are matters of fact, and we should be regarded as candidates for some lunatic asylum if we questioned them.

True philosophy does not inquire for the *reasons for* a thing before it admits the fact of its existence, but ascertains first if it be a fact; and if it is so, then to inquire after the reasons for it. This will be the course pursued in this essay. That water runs in veins in the earth is a fact now so universally admitted, or rather known, that no one pretends to doubt it; and it is equally well known that if, in digging a well, the digger hits upon the vein, he gets good spring or living

water. But the question is, how are we to ascertain where to dig in order to strike this vein? or is it a fact that some men, and even women, can tell, by any means, where water can thus be found? It will be admitted that, *if it is so*, it is of more importance to any dry or springless portion of the country than turnpikes, plank, or railroads; for what is the soil worth without living water? It will also be admitted that, if Nature or Nature's God has provided an ample supply of so useful and necessary an element as water, running in all directions in the bowels of the earth, the work would be incomplete, and man and beast might suffer, or a great portion of the earth must be left a barren waste, unless the same goodness which provided the supply also provided means by which its location could be ascertained with more certainty than by haphazard digging. This I take to be reasonable; and if so, reason favors the probability of such a provision. The first point to establish is the fact that some men can direct the well-digger where to strike the vein; and then, secondly, to show the law of nature by which this is done. As to the first point, it must be established by *facts* in the mouths of competent witnesses. It is done by what is now scientifically called Bletonism, which is defined by Webster to be "the faculty of perceiving and indicating subterraneous springs and currents by sensation; so called from one *Bleton*, of France, who possessed this faculty." Some call it divining, or raising the divining rod; some, water philosophy; and others, "water witchery."

The most ordinary instrument used is a fork, of peach, hazel, or willow, of the last year's growth, so as to be small, slim, and full of sap. The tip ends are placed horizontally in the hands, the palms of which are upward; this brings the fork upward in the shape of an inverted V—thus, Λ; and in the hands of those with whom it will work—for it does not work with every one—this fork-end is attracted by the water, if living spring-water, under ground, but not by dead or standing stagnant water; nor by what is called *seep* water. It is also attracted by silver, iron, or other metals which attract the electric fluid; for electricity is the secret of the matter, after all. But to the facts:

In 1812 I settled on a springless farm in Ohio, expecting to obtain water by digging a well. A neighbor of mine, who had on an adjoining farm obtained good water only fourteen feet from the surface of the ground, by means of this Bletonism, urged me to try the same means. But being of the class who could not, or rather would not, believe in what I could not comprehend, I declined resorting to what, to me, as to others, appeared to be consummate nonsense, and I spent my leisure time in the dry time of *three* years in digging, but found no water. At length, despairing of finding water in this way, and having a curiosity to *test* this new science, I invited a "water philosopher" to try his skill for me. It is proper to observe, that this man was an independent farmer, a man of intelligence and high moral worth; and as he performed in this matter without fee or reward, I had no possible ground for suspecting any design of humbuggery on his part. And further, he told me that he knew no more of the reason, the why or wherefore, it worked in his hands, while it would not in those of others, than I did. By mere accident he ascertained that he was "one of 'em;" and on discovering this, he experimented until he discovered this fact—that the rod would be attracted at an angle of 45°, and that from the point at

which the attraction commenced to where the attraction was perpendicular, would indicate the depth to dig to reach the water.

All this, however—his high character and his explanations—did not remove my doubts. He prepared his peach twig-fork, and I placed him over a well which I had dug, and was at this time full of surface or seep-water; wishing, if possible, not to lose the labor thus expended. But this seep-water had no effect whatever on the rod. The operator then travelled slowly, I keeping my eye upon the rod and his hands, to see if the turning of the rod was not from the motion of his own hands. At length the butt or fork-end of the rod went down; the operator holding his hands upon the rod so tightly, to prevent its slipping, that they turned purple, and I could plainly see that the twig-ends of the rod did not slip or turn round in his hand, but that the twigs actually twisted so that the bark broke and gave way. When I saw this I gave it up. What I saw with my own eyes, and that, too, against strong prejudices, I could not doubt. He selected the point where the dip of the rod was the strongest, and measured the depth by the 45° rule, and I stuck the stake to dig by; and in the ensuing autumn, when all was dry, I dug, and found the depth, quantity, and quality of the water just as he had told me. With such facts before me I could no longer disbelieve, because I had not then ascertained the reasons for it, or the law of nature by which such events were brought about. Shortly after this I saw a statement in the public prints—taken, I believe, from the *Cultivator*, of New York, over the signature of a respectable Quaker of that State—to the following effect: A friend of his called upon him, and, among other things, his farm, its beauty and high state of cultivation, came up as a topic of conversation, and the owner observed that he would sell it at half its value, because there was no living or spring-water on it. His friend inquired, "Why don't thee *dig*?" "I have," was the reply, "dug several wells, some of them ninety feet deep, and get nothing but seep-water, which is not good." "But," continued his friend, "why don't thee get a water philosopher to tell thee where to dig?" "Because I don't believe in such nonsense; I won't believe in anything of the kind for which I can see no good reason, and there is no reason why such a rod will work in one man's hands and not in another's." But his friend was not to be put off with so stale an argument. "But thou mayest believe it whether thou canst comprehend it or not, for I have proved it and know it to be true; and if thou wilt get a good philosopher, one who has been proved, and dig where he tells thee, if thou dost not find water I will pay thee all thy expenses." His friend was so urgent, and withal so liberal, he could do no less in courtesy than try it. He did so, and the operator fixed upon a site near the corner of his house, on the side towards the barn, from which the barn-yard could be easily supplied, and fixed upon twenty feet as the depth to dig. He paid the man his dollar and told him, "I have called for thee and I will pay thy charges; but I do not believe a word thou sayest, for here and there, within a few feet of the place thou hast fixed upon, I have dug ninety feet and found no such spring as thou tellest of; but if I do find it as thou sayest, I will give thee fifty dollars." The result was, he dug, found water as told, paid the man his fifty dollars, got him to select several other sites on the farm for wells for stock, and published his discovery for

the benefit of his fellow-men who might be in like ignorance and prejudice, and as much to their own damage as his was to him.

Some thirty years since, a tract upon this subject, from the pen of the celebrated Adam Clark, fell into my hands, from which, as well as I can recollect, I gathered the following facts: The Doctor, as a Wesleyan Methodist preacher, was stationed in the Guernsey islands, in the British channel, the inhabitants of which were originally French but now under British rule. He soon discovered that good water was almost a paramount object. Cisterns had been resorted to, but their supply depended upon the amount of rain, of which, in some seasons, there was a scarcity, and consequent distress among the inhabitants followed.

Now, if there was a place on earth or *in* the sea where this science was needed, it was here; and if it was humbuggery, this, above most places, was the place to palm it off, and the anxiety of the people to obtain a supply of good water would induce them to forego a few failures before they would give up the pursuit. The Doctor found things in this situation, and among the members of his flock a man who pretended to, or rather did, tell people where to dig for and obtain good water. But this was too much for the Doctor; he could or would believe in no such humbuggery, and he cited the member to trial for attempting to humbug, or impose upon, the people, which he would not allow.

Upon the trial, the accused proved by several respectable witnesses that he had told them where to dig; that they had done so, and found water as he had predicted. Still the Doctor was not satisfied but that there might be some mistake or accident, if there were no imposition; and the accused should select a spot to dig in his presence, that he might test the matter in person. This was done, and the water found. But lest this might have been an accident, he would have it tried over. It was tried, and again proved true. The Doctor could hold out no longer, and lay claim to the character of a reasonable man. The fact that such things were done by some, and could not be done by others, was established beyond the possibility of a doubt, and as a true philosopher he set about the inquiry as to the reason for such a phenomenon. But not discovering any law of nature therefor, he concluded that it must be a special gift of God to some, for the benefit of the human race.

These events occurred over fifty—say sixty—years ago, when philosophy was less advanced than at present. They happened, also, near the French coast, and among a people of the same language, and in communication with France; and possibly this profession went from Guernsey to France; where, being established as a fact, the acute philosophy of France was brought to bear upon it, as to the reason of, and for it, which resulted in the discovery of the agency of the electric fluid in the matter; and the whole is resolved into an established law of nature, though but recently discovered and understood.

A gentleman in the North "has been examining the subject for many years, and has tried a great variety of experiments, which show that all the phenomena of the rod are governed by the laws of electricity. He tested the rod by the electric machine. When the rod is brought near the positive pole, it is attracted towards it; but if brought towards the negative pole, it is repelled. A silk handkerchief placed be-

tween the rod and the water, or the conductor, breaks the connexion, and there is no electric attraction made upon the rod: remove the handkerchief, and the rod is instantly drawn down. All his experiments resulted in this explanation of the phenomena." The Rev. Mr. Avery, of Holden, some years since, made similar experiments, and came to the same conclusions. The subject has been thoroughly investigated, and with the same results. In almost every place there are those in whose hands the rod will operate, and men of high intellectual moral worth, and far above deception or trick, are found among them.

The law which governs in this matter is thus explained:

1. That wonderful fluid called electricity is distributed throughout the whole earth, but some bodies generate or imbibe more of it than others. Those that contain more than their natural proportion are said to be *positively*, and those which contain less to be *negatively* charged.

2. One of the established laws of electricity is found in the fact that two bodies, both *positively* or both *negatively* charged, invariably repel each other; while if one is positively, and the other negatively charged, they uniformly attract each other.

3. It is well known that the best subterranean conductors are beds of ore or native metals, and veins of water. It is their nature to extract the latent fluid from surrounding objects, and absorb it themselves; hence where these exist, there will be the most electricity.

4. In general, the human body is also a good conductor, but there are some exceptions. Some men usually generate or imbibe the negative and positive in such equal quantities as to maintain an equilibrium in their systems: the rod in the hands of such will not be sensibly affected; others are surcharged, and have more than their share, and produce positive electricity. Such it is said, if they have black hair, will, if rubbed in cold weather, emit sparks.

5. An individual containing a very small amount of electricity, or who is highly negatively charged, (and only such can operate,) if he takes the rod in his hands and passes over a surface beneath which there is a stream of water, or a stratum of ore, by the unchanging laws of nature, the rod *must* be affected; and, consequently, a sensation will be produced in him who holds it. The person making the experiment is highly negatively charged—that is, has but little of the fluid in him: the water beneath his feet has absorbed the electricity of the adjacent bodies in the earth: the elastic twig in his hands forms a part of the connexion between the positive and negative poles; and two bodies, the one positively, and the other negatively charged, by a law of nature, always attract each other; and, under such circumstances, most unquestionably the twig will be attracted downward towards the water, and the operator will *feel* it as well as see it.

6. If the experimenter is positively charged, like the water below, his system having produced or imbibed a large portion of the latent fluid by the law already referred to, there will be a repulsion: the twig, instead of bending downward towards the water, will bend backward towards himself, and the result will be equally perceptible.

A recent extract from a French paper gives the description of a man, of high moral and intellectual standing, who is so sensitive to electrical influence that he can tell without a rod or anything in his hands

where the veins of water are by the sensation produced upon the throat as he passes over the earth. The sensation is similar to that felt from a galvanic battery.

The reader may inquire how we are to know whether the attraction is from water or from ore of some kind? The answer, as to most countries, is, that the geological character of the ground will generally determine the point. That, however, will not answer in the lead mines of this region. Here the surface presents so different a soil from that of other mineral countries that no law of *the books* can apply to us. One thing is certain: if it should prove to be mineral, it would probably be valuable; so that nothing would be lost, by the experiment. But in some scores of trials for water in this mineral region, by means of the rod, not one, to my knowledge, has failed, or led to mineral instead of water.

There are numbers of miners among us who depend on the rod to find crevices in the rock under the clay surface. They seek for crevices because lead ore is usually found in them, though there may be, and are, many crevices in which there are no minerals. My observation in this matter leads to the conclusion that a vein of water has stronger attraction for the rod than any of the ores, excepting silver and iron, and that they must exist in considerable quantities to attract equally with water; so that, if the operator should happen to hit on ore, instead of water, there would be no loss. To what depth the electric fluid will attract I am not advised. I have known water to be found in this way from ten to forty feet under the surface, and my impression is that it will reach to a greater depth—possibly to seventy feet.

It is hardly necessary to point out the advantages of this science to the farmer, or its value to every springless farm. The farmer wishing to build, and to have water convenient, will first discover the vein of water, and dig his well. The operator can be tested or proved before the positive pole, or any electric machine, or by having previously found water. It will save time and money lost in haphazard digging, and will add greatly to the comfort of a family to have water at hand; and to make this certain let the water be first discovered, the well dug, and the house then built to suit the situation.

ALFRED BURNSON.

Hon. THOMAS EWBANK,
Commissioner U. S. Patent Office.

AGRICULTURAL EDUCATION.

SUTTON, WORCESTER CO., MASS.,
February 12, 1852.

SIR: By invitation from your most excellent department, I propose making some suggestions beyond those of last year, published in your Report for 1850. Those were intended to be strictly confined to the usual Circular inviting statistics, as it does from all parts of our widely-extended country; and the information thus collected and placed in so condensed a form gives a thinking community an opportunity of observing some of the apparently good reasons why our sons are, and have

been for the last ten years, leaving the old homestead for the crowded city or the far West. It would seem to be because our soils have been under the skimming process for a long term of years, and that our young men had never found out that there was any science in agriculture until it was too late for them to retrace their steps; and the consequence is, that their places are filled with laborers from all parts of the wide foreign world. Sure it is they have health and a strong arm, and may be called servants, and more properly than "helps," so that the foreman or master must necessarily be constantly in the field with them, or some unaccountable mistake will be committed. They have no minds and no care for the general welfare of the crops.

This was not the condition of the farmer in former times, when his sons were at home and in the field. Then he could feel quite at ease in his old age, as they understood his method quite as well as himself. In too many instances where the sons have left, the father has sold the old homestead rather than undertake to carry on with such servants as he could obtain, and retired, perhaps, to the town or village, there to spend his last days with some friend; whilst his mind is back to the old homestead, regretting, when too late, that he so abruptly left the only home he will find in this world. And we may very naturally ask the question, What has become of the old homestead? Why, in quite too many instances, it has fallen into the hands of one of his neighbor farmers, or rather into speculators' hands, whose plan of operation is to purchase a farm in a high state of cultivation, with good buildings and fences thereon, and then put it under the skimming process and get all he can from it, without any expense or labor for improvements; buildings, fences, and fields are all used for present advantage, that he may pocket the proceeds. The soil is soon exhausted, and the farm is sold for what it will fetch, and another purchase made. By this means he obtains wealth just as any miser does. This destructive system is by no means confined to Massachusetts, but shows itself at every turn in the road in the United States. How desolating to a neighborhood—how destructive to society!

Is there no remedy for this evil? I think there is: by letting our sons become acquainted more generally with the science of agriculture. But how is this to be done? It is said that we have no American science. Now, if this be the case, should we not go immediately to our national government and acquaint them with the fact, and request of them the immediate appointment of a few young men to the different professorships that may be necessary for teaching American agriculture—such as analysis of soils, agricultural chemistry, &c.—and place them where they can obtain such information, with suitable pay for their maintenance. Take them if you please from the plough, as such young men are far to be preferred to mere literary professors, that have already gained a reputation. And I suppose it is not to be doubted that our government is willing to make an appropriation sufficient to buy a section of land near the capital, to be used as an experimental farm, where all foreign seeds can be naturalized, soils can be analyzed, and where every American can obtain such information in relation to crops, and all other information in relation to experiments on the best breeds of cattle, swine, and best method of making butter and cheese, and preserving them, whilst his son may be permitted to enter the institution of learning that shall be erected on this beautiful spot, and where his chance for an education shall be as great or

greater than at any other institution in this country, and at as cheap a rate. The student here gets theory and practice, and when he comes home to the old homestead he sows his good seed broadcast, and the result is beyond all calculation. If men had been intended for farmers without using any reasoning powers, God in his mercy would have given them the perfect instinct to accomplish in a right way whatever fell to their lot to do. The other day an ancient agricultural gentleman, and a member of our board of agriculture, while attending a meeting of this board at the State-house, said he believed that the great reformations in the construction of our ploughs were entirely a matter of accident. The State Agricultural Society offered large premiums for ploughing at their show at Brighton, near Boston, more than 30 years ago, and the object was to bring out the strength and action of our oxen; and in those days it required great labor to draw the old wooden plough; but the plough-maker was in the field, and what did he do but go home to his work-shop and put his thinking powers to work, and soon gave us the very thing we wanted; and so it would be if we could establish agricultural schools and experimental farms in each State of the Union, where all of the useful experiments could be made, and where the farmer could have free access at all times, and especially where his sons could obtain the foundation of a useful, practical education; where he could go out with his class each day and learn the best method of handling tools of all kinds—to the stable, and there learn, by a lecture from a practical herdsman, the good and bad qualities of cattle and horses, sheep and swine; thence to the garden and orchard, and so back to the school room, where he may be taught at least chemistry, geology, botany, and the physiology of animals, and a thorough knowledge of agricultural book-keeping. And thus, whilst he is laboring (rich or poor) one half of each day with his class with a a practical farmer, he is all the better prepared for the school-room the other half; where he should remain until he shall have obtained an education suited to his wants, or such a one as shall fit him for a national school or college as we hope to have soon. The legislatures of Massachusetts and New York have been talking for years upon this subject, and I have no doubt that something acceptable to the farmers will be accomplished; though in this object we have strong prejudices to contend with. The old class of farmers have taxed the land to the utmost, and think they have done well because they got what they term a good living and put some money in their pockets. This class do not wish to exchange their old harness for a new one. They were slow to adopt the cast-iron plough, for fear they should break a point occasionally; and the horse rake they did not believe would rake clean; and the threshing machine was out of the question with them, as they had flails, and nothing else, for winter work. But a little experience with these new fangled notions has worked wonders. They now find it convenient and easy to use this kind of machinery; so that the more enterprising among them have time, after the hay and grain crops are out of the way, to reclaim some of their swamp land by ditching and carting on sand; while others are draining their clayed hill soils, and, much to their surprise, have found their account in, and all this time saved on account of using labor-saving machines. It might readily be supposed that, if an institution of this character would be the means of greatly increasing our products, and at the same time greatly regenerating our worn-out soils, each indi-

dividual State would embrace the opportunity at once, and thus our representatives and senators in Congress would be instructed to see that an institution that should do credit to the whole country and world be established immediately. At a late meeting of our Board of Agriculture, intimations were given out that the funds required for such an institution must necessarily be large. (This was for a State or home institution, preparatory to a national.)

Well, the question is, how large? I, for one, would be satisfied with an appropriation of one hundred thousand dollars, which would put the farm, and school rooms, and all necessary buildings, well stocked, in running order, for at least seventy-five scholars; and, if more funds were required before the end of the first experimental year, we could surely depend on rich men in Boston and elsewhere, whose whole heart is engaged in this matter, to assist by liberal donations. What if you fail in accomplishing your desired object in educating your young men for practical farmers? Why, if we do, the first outlay will go back to the State, and we be disgraced for our folly for asking for such an institution a whole half century too soon. But there is no such word in the farmer's dictionary as failure, with the young farmers of old Massachusetts. They were born upon Plymouth rock, and cradled in her storms, and how can they fail if knowledge is power, and they get knowledge? Want is said to be the parent of invention; and as it happened, last fall, I had a few head more of cattle on hand than I had convenience for wintering, and so it occurred to me that, as the hay crop was large, I could get some of them wintered on reasonable terms, and I soon found enough good practical feeding farmers that would be glad to take them; and, when the price per week was named for keeping on good hay, the different farmers varied so much in price per head, by the week, that it put me to thinking, and so I inquired what good English hay was worth per ton at the barns; and all agreed at once that it was worth about ten dollars, and that they should be glad to take my steers to winter, as they wished to spend all their products on the farm; that they wanted to fill their barn cellars with manure, and were willing to spare their surplus hay in this way, and should be willing to give their labor of tending for the manure. What will you charge per week for keeping? Don't know; what would be right? My steers are two years old, past, and weighed this morning, before drinking, two thousand pounds; were put into the stable, and they drank seventy pounds of water; and now if you know what per cent. of good hay such cattle eat per day, on their live weight, we can agree on the price I shall pay per week for keeping. Mr. A. said he thought they would eat about one per cent., or twenty pounds to the pair, per day, or one hundred and forty pounds per week. Mr. C. thought about two per cent., or forty pounds, per day, or two hundred and eighty pounds per week; but Mr. B. said he could tell all about it; they would eat three per cent., or sixty pounds, per day, or four hundred and twenty pounds per week. Finding so great a discrepancy in these men's minds, and fearing he might have fixed his sum too low, which would be seventy cents for the two steers per week, and not feeling willing to pay Mr. B $2 10 per week, or thinking it would prove a ruinous business to pay $2 10 per week for twenty weeks, which time cattle in this climate are required to be at the stable, making a sum total of forty-two dollars—in such a case what was to be done? Why, I went on with my

inquiries, and asked as many as a dozen what their opinions were; and their answers were all within the above markings, namely, from one to three per cent. on live weight; so that one man's guessing opinion was that it would cost fourteen dollars to winter them; another, twenty-one dollars; and the last one, forty-two dollars; and none of these men were ignorant; no such thing.

Our farmers, I will be bound to say, are as well posted up as any in the United States. Thus you see I was left in a bad fix. These being a beautiful pair of North Devon steers, I came to the conclusion that I would go home and make room for them in a convenient stable by themselves, and that I would try a thorough experiment on their feed for a length of time, that should satisfy all doubts upon this question. After getting the steers each in his place, the thought occurred to me that I would regulate my experiment in accordance with the directions of a private individual, a thinking, enterprising gentleman, who spends annually from 80 to 100 tons of hay, and much time, thought, and money, for the advancement of agriculture. And this proposition I find at the bottom of a long list of premiums by the Worcester County Agricultural Society. The above-described gentleman offers this premium of $50, and has put the money into the treasurer's hand, without giving his name, (but I know who he is,) under the following regulations, namely: The trial to be made with at least two animals, their condition to be as much alike as practicable; the time of trial to continue at least 8 weeks, divided into periods of two weeks each; one animal to be fed with cut when the other is fed with uncut hay; and the feed of each to be changed at the expiration of each two weeks; and so on, alternating each two weeks during the trial. If any other food than hay be given, (such as roots or meal,) the same quantity to be given to each, that the result in relation to the cutting of the hay may not be affected by other food. The animals should be kept in the same stable, that they may be in the same temperature, the average degree of which is to be stated; if the trial is made with cows, the time of having the last calf must be given, and also the weight of the milk given by each cow during each period of the trial; each of the animals to be weighed at the commencement of each two weeks, and at the end of the trial; and the statement must give an account of their condition, age, and every other circumstance that can have any influence upon the decision of the question. And that the experiment may produce the most satisfactory results, the same kind of hay (what is usually called English hay) should be used during the whole time. The time of giving the food and drink should be regular, and also the milking. The time of weighing should be in the morning, and before the animals have been allowed to drink. The statement must also give the quantity of hay, whether wet or dry, and other food given to each animal, and of each kind, during each period of the trial, and to be forwarded and received by the recording secretary of the Worcester County Agricultural Society on or before the 15th day of March, 1852, to be laid before the committee appointed for their adjudication. The steers I have been speaking of have been strictly on this trial for the last three weeks; have not been permitted to go out of the stable only to be weighed; the water and food have all been weighed, and their nature and health, and aptitude to fatten, are so similar—being only five pounds difference in weight—that I consider them the best two animals to experiment on that have ever

come under my observation. Several experiments of the same nature are now being tried in different parts of Worcester county, the result of which will prove most beneficial, and no doubt will be published, as the gentleman offering $50 for the experiments is public-spirited, and will have no desire to keep any information hid that will be of benefit to the agricultural community.

The same kind of questions were put to the intelligent farmers in our county—such as, What is milk worth in your vicinity to be manufactured into butter, butter being worth 20 cents the pound? How many quarts of milk does it take for a pound of butter? Is there any great difference in the milk of our common native cows for butter? Is it sure that the cow giving the richest milk for butter will make the fattest calf? Ought cows to give milk and butter in proportion to their live weight? Do cows consume food in proportion to their live weight and the milk and butter made from them? How many quarts of milk and pounds of butter does your whole dairy give in nine months? Is there any difference in the milking qualities of your cows, according to their weight?

To the above questions I have not found one in a hundred of our practical and otherwise intelligent farmers that could answer, from knowledge, one of these common-sense questions; nor do I believe they can be answered by one in a thousand throughout the whole of the dairying districts of the country. But the question has been asked, and answered with some degree of accuracy, (namely,) Can the present stock of cows that have come under your observation be made, *by selection* alone, and without any change in feed or extra labor from such as is now bestowed on them, to improve in their milking properties, so as to increase their milk 2 quarts per day for 9 months in the year? It is understood by this proposition that the next generation of cows shall be selected, when calves, from the best half of our cows, as one-half are as many calves as are raised in New England. Further, it is proposed to give a good bull for each 50 cows, instead of indifferent and some decidedly bad ones, as at present, and allowing the good bulls to cost $50, and that the present bad ones would sell for no more than $20 each. And the answer in most cases has been, that they thought it could be done by taking a little more thought and some action. Now it occurred to me, if this could be done, it would pay, in part at least, the outlay that we are asking our legislature to appropriate for an agricultural school and pattern or experimental farm; and, as I was in Boston, I stepped into the secretary of State's office, and carefully took down the number of cows as returned to that department in May, 1850, and found the number from Worcester county alone to be 35,594, and the two-year-old steers and heifers to be 17,837. Now we will suppose these cows, by wise thought and attention, to be increased in their milking properties 2 quarts per day for 9 months, or 270 days in the year; and that milk is worth, in all parts of Massachusetts, 2 cents per quart for manufacturing butter—here it is: 35,594 cows, at the above reckoning, would make $10 80 for each cow, or a round sum of $384,415 20. Add to this sum, as increased value on two-year olds over the old stock, say $35,674, which would make a sum total of $420,089 20; deduct from this $21,330 for good bulls over the old stock, and we have left $398,759 20—and this for Worcester county alone, with a population of 140,817, or about 1 cow to each 4 persons. The cows are supposed to yield at least 4 pounds of butter per week for

40 weeks in the year, and at least one-half of this butter is manufactured in so careless a manner that it sells for but 17 cents the pound, while good butter sells readily in any market in Massachusetts for 20; and as the bad butter requires the same amount of materials and labor as the good, here is another item of $78,296 80, caused entirely through ignorance and a general want of knowledge in its manufacture and preservation. Then there are our oxen, our one year olds, and calves in process of raising. I have not the statistics as to number, but, from an extensive acquaintance in the country, have no doubt they would more than equal in number and value the cows and two-year olds, and it is the opinion of some of our practical farmers that an equal amount could safely be placed to their credit. With the same advantage that we propose to give to cows and two-year olds, if this be true, we have a sum total on horned cattle alone to the amount of $797,518 40, besides the loss on badly manufactured butter, as above, to the amount of $78,296 80.

As large as these figures look, I believe, from personal observation, that it is far below the real loss on neat stock alone, by mere ignorance and inattention to the subject and knowledge of breeding and caring for our stock. I have taken up this one individual subject of neat stock, and on this small territory, (only about the tenth part of the State,) because, in the first place, I have a pretty good opportunity of knowing, from personal observation, the condition of stock pretty generally for the last twelve years, and of most other counties in Massachusetts; and should say, without prejudice, that more care and attention are bestowed on this one branch of farming in Worcester than in any other in the State; and would further add, that it is my conviction that no farmers in the State are better posted up, or more ready to adopt any substantial improvements, than the farmers of Worcester. I will leave others to judge whether our cattle, as they are, and have been for the last ten years, will not favorably compare with the other States in the Union? In purchasing several thousand head (for our market) from the farmers individually, in sections of all the New England States, for the last dozen years, and from a patient, continual inquiry, I believe it would more than compare.

As I have my stock-book before me, I will give a sample of the differences in prices paid last October by myself in Vermont: Lowest price paid for one-year olds, $6; highest price, $20 each; two-year olds, average $14; lowest price for any two head was $9 each, and highest price paid for any two was $40 each, and other ages in proportion. This was on a lot of 110 head, bought for what would be rated store cattle, to be wintered. Though, for various purposes, and with my present object in view, I spared no pains to inform myself of the reason of this great discrepancy in the prices of cattle in a single neighborhood, when I had found the same difference in the quality of stock for several years, all my observations and inquiries have resulted in this fact: The farmer that raised the cheap stock had expended very nearly as much feed and care as the breeder and grower of the high-priced stock, and should put the difference at $1 per head; while the farmer that made good cattle is never necessarily obliged to look up a market for his stock; whilst the farmer that keeps poor stock is obliged to sell for what he considers a low price and slow sale; and, perhaps, there cannot be found a more intelligent and thinking set of farmers in the United States than these Vermont farmers are; and I believe, from experience and observation,

that this difference in the worth of good stock and bad will be found in all of the New England States, and certainly in northern New York. The grower of inferior stock says it is just the same kind of stock that has been on the farm for years, and he cannot afford to go into this high-priced stock, and finally has never thought much about it; whilst the breeder of good or improved stock says he cannot afford to have anything to do with bad stock; his father used to keep them; but he was on to the New York cattle show a few years since, and was convinced, whilst there, that it was ruinous for him to pursue the old course; had brought home a good bull, and here was his stock. And then there is the same great difference in their horses, sheep, mules, and swine, which will swell the amount, as I have estimated them, to four times at least the amount stated on milch cows and two-year olds, in Worcester county; and this sum, great as it is, must be admitted to be a sample of the annual loss to a very large portion of our whole American farmers.

Admitting the above statements and observations to be true, and that this condition of things exists throughout the nation, I would ask if there would be any harm in urging this subject strongly upon the early attention of Congress, and insisting upon it, that appropriations shall be granted sufficient to establish an agricultural college, connected with a pattern and experimental farm, where young men may graduate with honor and great usefulness from all parts of this widely-extended country —where agriculture in its highest state may be studied, and sciences applied—where all the different breeds of cattle, from the short horn or Durham to the last Hungarian cattle, shall be experimented on, and their different qualities proved—the best and different ways of feeding stock and caring for them—where all the great variety of soils may be taken to pieces, and their good and bad qualities exposed—where veterinary surgery may be carried to perfection, and all the other arts and sciences carried to as high a state of advancement as they can be in any other country on the face of the earth? And this institution should be strictly American in all of its departments. If it is said we have no American agricultural science, it is high time we had; and young men enough can be found in all parts of the United States, with hearts beating high, and who have earned a reputation at home in following the plough and subjecting the noble ox to the use of man, and who have preserved and built up a strong constitution, and who have a longing and thirst for an improved American agriculture. Let such young men as these be immediately appointed to the different desired professorships, with annual pay sufficient for them to obtain the most complete education that can be obtained at home or abroad in the particular department of each; and as soon as an institution can be put in running order, they can be home, ready to take their respective situations and do lasting honor and good to all coming generations. Once started, we shall find enough talented young men that will be rapping at the door of agricultural science, and showing us that, with the one talent they had intrusted to them, they have gained ten other talents, and therefore have a just claim to come in.

I would not distrust the wisdom of our government; but, in reviewing fac-similes of letters from Gen. Washington to Sir John Sinclair, from 1792 to 1797, on agriculture, we can see with a single eye that he had his mind strongly upon this subject, and, strange as it may appear, more so

than any Chief Magistrate, or perhaps other officer in our government, for this whole generation and a half. Whilst all other interests have been well cared for, this greatest of all interests has been strangely overlooked. The manufacturer, the mechanic, the merchant, and scholar have always had their particular advocates in Congress; whilst the farmer, who is the very father of our representatives and senators in Congress, stands afar off, and not so much as lifts up his voice in prayer (amongst his more clamorous sons that have left his peaceful fireside for other crafts) to Congress and insist, as he should, that, if the manufacturer needs protection, to him is the entire privilege of at least growing the raw materials, such as cotton and wool. The statistics in our trade in foreign wool surely look bad, when there is not a particle of doubt that this is the best country in the world for its production. Sheep husbandry is not depreciating in its tendencies, but, on the contrary, a great renovator of soils—no complaints, where the sheep ranges, of worn-out or hungry soils; but look on the other hand, and see the vast extent and hateful-looking waste lands that have been entirely impoverished by growing grain for the city and foreign countries. And whilst the unskilful manager of these (at present) unsightly soils has pocketed the cash for the skimmings, in the shape of corn at the East and West, and the grower of tobacco and cotton at the South, nothing has been brought back to feed these, Pharoah-like, hungry soils; and all the present unskilful cultivator of them can do, is to hand them down to his sons, to go through another fiery trial. But they refuse to give us more than twelve bushels of wheat, where they gave our fathers twenty-five. And our Anglo Saxon sons, who are well posted up in all other of the arts and sciences but that of systematic farming, say they cannot, they will not, take the proffered remnants of this old homestead; and it is left to the *worn-out fathers*, or perhaps widows, or weaker or discouraged sons, to till on, and own.

Whilst the Anglo Saxon spirit of our fathers is being developed in our sons, whose passion was, and is, *land*—more land—and whose courage, energy, and activity have lost nothing by time, they start for the far West, where they can have land in quantity and quality to their heart's content; and as they want nothing but the axe and plough in that region of fertility to go on with the same principle of skimming that has been taught them in their fatherland, it cannot be expected that their present farms under this system will last longer than their fathers' did in the old States. It is West, and more land, until we have already reached the great waters of the Pacific. Now, I would ask, has the time not arrived that we may expect some of our leading men connected with the government will lend a hand for this object? I am presuming that many, if not all, of the several different States will soon form themselves into what may be called a board of agriculture, and after being duly organized will make it their first business to gather all the statistics on all the different branches of agriculture in their respective States, and report to their monthly meeting; and they will not have to go far before they will find causes enough to petition their legislatures to establish an agricultural school and an experimental farm, calculated at least to prepare young men in all its branches to enter the establishment for agricultural education that shall be founded by the national government. If any man in the whole country doubts the propriety or necessity of this undertaking, let him go to work and pick up the statistics for his own town, county, or State in

the same way that it has been done in Worcester county as above, and he will find that he will be safe in contracting with our government to put one establishment in each State in working order, and permanently endow it with professorships, and hire and maintain practical farmers enough to man it in all its departments for any term of years. If they will agree to pay him one-half the present loss on milch cows and two-year old cattle resulting from ignorance and thoughtlessness in selecting and breeding alone, the contractor may go further, and pledge himself that a spirit shall be awakened within five years from the opening of these agricultural institutions that shall convince every reasonable man of their usefulness.

You have the figures as above for Worcester county; loss as above on cows and two-year olds annually $398,759 20, from ignorance and thoughtlessness in the management. On oxen, one-year olds, and calves as much more, which we agree to improve without any pay; besides all other domestic animals usually kept on the farm. And now we will look for a moment to the economy in the making, preserving, and applying of manures: a lack of knowledge of the wants of our soils, as well as their natural capacity for the production of profitable crops, and of the most economical way of feeding out crops to the best advantage, and preserving and increasing the fertility of our land. After the best estimate that can be made on the losses annually sustained in this county alone, and all added to the loss on cows and two-year olds, put all these losses together, which, at the lowest estimate, would amount to more than one and a half million of dollars annually, or fifteen millions for Massachusetts. Are we calling for a remedy at too early a day, or at too high a cost? If the statistical information is correct which has been gathered from all parts of the United States, and published by your department, which has been the means of doing much good, it shows at a glance that Massachusetts is not behind any of the other States in its agricultural department certainly? But, for convenience sake, we will call them equal, and compare the statistics as above with the other States in the Union, and make figures for the loss they annually all sustain for the want of agricultural knowledge; and your book will be full. The estimates will then fall further short of what would be realized with this knowledge than Dr. Franklin did in stating that it was his conviction that the United States mail, within half a century from that time, would go through from Philadelphia to Boston in twenty days. Old Virginia, with one of the best natural soils and climates in this country, reports that her tobacco crops for the last half century have depreciated her soil to so great an extent, that her wheat and corn crops come down to a very low mark—so low, that her sons cannot afford to stay at home any longer, and so they go further south. Shall old Virginia be forsaken? I answer, No. Her soil must be regenerated, her crops changed, her wasted manures saved, her ploughings deeper, and she, too, must be saved. And is this not a fair sample of all the old tobacco, cotton, and sugar growing States of the South? Can we do without her products? No. Then should not they also study the nature and wants of their soils which are required to produce her valuable staples? Have not they, as well as we at the North, an abundance of fertilizing matter at home, locked up in hills and valleys? And is there anything but the key of agricultural knowledge wanted to bring them to light,

and cause them to act like leaven in a measure of meal? There are one hundred thousand barns in Massachusetts alone; and would it not be reasonable to suppose that ten dollars' worth more of manure could be made and preserved than now is in each, annually making a loss of one million of dollars a year? So far as my personal observations have gone, the figures are altogether too low; and I would add as much more in way of loss by the annual misapplication of these manures, besides the great want of knowledge in the natural compositions of our soils and their wants; and to illustrate this general want of knowledge, I would state one circumstance which occurred on my own farm:

In the fall of 1849 I had determined to underdrain a portion of land which had been in former times subdivided into lots, containing from one to three acres, by heavy walls, composed principally of small stones; and as a part of these lots were in cultivated fields, and the other parts in unsightly, bushy pasture land, I had determined to throw several of these lots into one, making one lot of 23 acres—this land being what we term high-hill land, being located within one half mile of the river, and still more than 500 feet above its banks, and is what is generally termed a loamy soil, with a stiff clay sub soil. My plan of operation was to dig a dike close along by the side of these squalid and ancient walls, which ditches swallowed up about one half of the wall, and the balance of these walls was taken to fill other interior ditches, which were cut 3 feet deep by $2\frac{1}{2}$ wide, one in every 5 rods, with cross ditches to carry the surplus water into the principal ditches. These ditches swallowed up all the stones of the old partition walls, as well as all the surplus stones on the surface of the land, and they were filled within 8 inches with stones, and carefully covered with much brush or leaves, and a sufficient quantity of the soil put back to come to a level; and the balance of earth from the ditches was used for grading any low spots that were to be found; and to show the trouble I got into by not employing a practical engineer to lay out my work, and from my own ignorance of the matter, I will state that this plot of land has a gradual, uniform descent of about two degrees to the north, until it strikes the road leading east and west, and which road about equally divides my farm. Below the road I have about the same kind of land as where I had been ditching above. In the spring of 1850 the water which accumulated in about 400 rods of these drains was emptied into the main drain, and then into one prepared at the side of the road for the purpose of being carried off through what I supposed to be a natural channel, and through land belonging to one of my best neighbors; but in this I was mistaken. In the first place, my ditch by the side of the road would not hold more than one-fourth of the water which was collected in the drains above; and the consequence was, that the road was badly washed, to the great injury of myself and the public, and my neighbor objected to its being turned on to his pasture in such unnatural quantities; and not wishing to injure the public, nor my neighbor, what was to be done in this case no one could tell. For my own part I began to fear, and some of my friends were ready to join me, that I had commenced a rash undertaking without looking at the results; that water enough to drive a saw-mill on high and apparently dry land was not so easily managed. In this dilemma I inquired of the president of our agricultural society what could be done, knowing that he had handled much water in the way of irrigation on

his river land, and he told me at once to turn the water across the road, and throw it over some mowing lots below the road, where the descent was more rapid—say 5 or 6 degrees. This was done, and to the utter surprise of every one, 7 loads of hay were cut in July, where 4 loads of like dimensions were the extent that was ever cut before. This was from the hay harvest of 1850; in that of 1851, the difference in favor of the crop of hay was still larger. I have 12 acres more, next adjoining this, and I propose irrigating these also. Is there not something strange in all this: that water can be taken from these drains, and, after running one hundred rods in an open ditch, then be used for irrigation on similar lands? It is passing strange to me, and yet I should be loth to part with this water for what my ditches cost, which were only intended for under draining above. Would not a thorough knowledge of irrigation and application of water to most of our lands pay many millions annually? Are not our thirsty American soils better adapted to irrigation than those of Europe? Their atmosphere is more moist than ours; but Europeans pay greater attention to this subject than we do. Indeed, in this country, not one in a thousand uses water even when it can be had from natural streams.

I will here state that, in opening or digging these drains, my attention was called to different materials which were thrown out; for instance, here was red clay, and there was a fine gritty sand, and all sorts of materials; and land of similar appearance on the surface. If a chemist could have been obtained, I should have had these soils taken to pieces, and there is no doubt in my mind but what the result would have been greatly in my favor for present and future operations; as it is, I am no better informed of the wants of these soils than before the land was broken. But one circumstance is certain, and that is, that my crops have been more than doubled on this under-drained land for the last year. And what has done it? Was it under-drainage? I, for one, will not undertake to decide this question, if it was. Millions of acres in New England stand as much in need as mine. Many experiments are quite too costly for individual enterprise; and they should be carried to perfection by our State and national governments upon experimental farms. And the same may be said of the great subject of cattle-breeding in this country. Individual breeders cannot succeed in this important science; first, because no man has ever began early enough, or lived long enough to perfect his plans. Individual American breeders we have, it is true, and men of the very first stamp, who have done and are doing much; but they labor under great disadvantages. Besides, we have but few men in this country who can afford to go further than what is for their individual interest, and they have no neighbors with whom to compare notes. Mr. A. goes for short-horns, and Mr. B. for the Devon, whilst Mr. C. is for the Ayrshire. Each one advances his own opinions and is generally in favor of his own particular shire. This branch of business should be carried out by our government also, and could and would be done on the experimental farm, and great and lasting good would be the result to this whole nation.

Yours, truly,

HARVEY DODGE.

Hon. THOMAS EWBANK,
Commissioner of Patents.

AGRICULTURAL EDUCATION.

Extract from an Address before the Agricultural Society of Essex county, Massachusetts, in 1851; *delivered by* Milton P. Braman.

1. The system of popular education should enlist our ardent sympathy and support. Three fourths of the people of the United States are said to be engaged in the labors of the field. These three fourths reside in the country, and are receiving their education principally from the common schools. A very small proportion extend it beyond the means which these seminaries afford for mental cultivation. So far as the influence of the school is concerned, they owe the direction and discipline of their minds, and the information with which they are stored, to these sources of instruction. They are three times of as much consequence to the farmer as to all the other classes of community, so far as relates to the numbers connected with them, besides the importance which they derive from the fact that such kind of education is for the most part acquired in them, without the additional aid of academic and other higher institutions. It is the concern, then, of every farmer, and of all others who feel interested in the improvement of this class of our citizens, as well as in the progress of the noble art to which they are devoted, to render these instruments of popular education as efficient and useful as possible.

Aside from any considerations connected with the advance of agriculture itself, to which the present remarks are particularly directed, it cannot be denied that those institutions, in which so large a part of the youthful portion of the community are receiving almost all the training which is acquired from professional teachers, deserve the highest attention and support. The common school is eminently the farmer's school; it is not only the primary school, but the academical institution, and the college in which he takes his degrees, and whose influence contributes so much to form character and fit well, or imperfectly, for exercising those rights of citizenship, which, always most important in any circumstances, assume a most transcendent and fearful consequence when we consider the preponderating numbers of the class with which he is associated.

But I have particularly in view the influence of education in fitting him for a more successful prosecution of his employment. There are some persons who think little of agricultural seminaries and scientific farming, but place great reliance on the observation and experience of practical men. From the value of the maxims of experience I would not detract a particle. But all must allow that the observations of some men are worth infinitely more than those of others, and that, if the agricultural interest is to depend chiefly on observation for its progress, we need wise observers. If we must place principal reliance on the opinions of practical men, we should have intelligent practitioners. Every agency which strengthens and expands the powers of the mind fits a person for a keener and wiser observation in any department of labor to which he has addicted himself; and, other things being equal, the best reader, grammarian, and arithmetician in the common school will be the most intelligent and successful cultivator of the ground. An inactive and torpid mind will make no observations, institute no comparisons, deduce

no inferences. The mind of the farmer is as much better fitted to gain useful practical knowledge by cultivation and discipline as his arm is to labor by having a strong muscle and bone.

It is a matter of congratulation that those who cultivate the soil in New England enjoy such advantages for early education. It was once a common complaint in England that the farmers were men of dull and sluggish minds. Wesley said that he could do nothing with farmers—an observation of course to be understood with reasonable limitations. While the colliers, and manufacturers, and the degraded populace of London could give a quick response to the tones of his stirring eloquence, the mind of the farmer was comparatively unsusceptible and impenetrable. Our free-schools and other public institutions have made a difference in favor of this class of persons among us. And through the extension of the same influences, particularly those of school education, which have produced this diversity, every farmer can be made a wise observer, skilful to compare results, sagacious in deducing conclusions, and able to be a useful contributor to the common stock of information and improvement. But this is not all we need.

2. Agricultural schools on the plan of those in Europe, taught by men versed in all sciences connected with the cultivation of the soil, and to which lands are attached for the purpose of experimental and practical farming. The attention which this subject can receive in the common school must be of quite an elementary and general character.

Whilst the knowledge gained in this way is useful as far as it goes, it does not meet the present demand. The common school is already so crowded with studies which are thought to be indispensably important branches of education, that there is a strong tendency to want of thoroughness in the manner of teaching those which are of the first necessity and lie at the foundation of all knowledge and mental discipline. Besides, among the thousands of teachers who resort to school-keeping, as a mere temporary employment in the younger period of life, with minds comparatively immature and unfurnished, and upon whom our common schools must depend for an indefinite period, how many are qualified to teach any more than the mere rudimental and general parts of the science, from meagre text-books prepared for the purpose, without the aids of experiment and practice which will be furnished by the proposed schools, and are of such vast importance to complete the preparation of those who are destined to the employment of husbandry? The system of common schools must undergo a complete revolution, and become very different from what it is now, or will probably become within any period of reasonable computation, before it will meet the exigency of the case and satisfy the demands of agricultural education. There can scarcely be conceived anything more impracticable and visionary than the projects of some who propose to employ our present system of free-schools as an instrument to diffuse the necessary degree of agricultural science among the people. They might as well be metamorphosed into colleges and universities, into schools of law, medicine, or theology, to teach the whole circle of the sciences and prepare young men for the three professions, as to take the place of those agricultural seminaries, for which there is such an imperative call in the community.

The proposed schools offer the following advantages: 1. The teachers will be men exclusively devoted to investigations connected with

an improved state of cultivation. We have few or none of this description among us. We have learned professors of chemistry, mineralogy, and botany, whose profound researches into sciences which it is their business to illustrate have been of inestimable advantage to the concerns of agriculture; but if we could have gentlemen of equal intellectual character and attainment placed in situations whose duties require them to pursue the study of these sciences with reference to the cultivation of the soil, they would contribute in a much greater degree to the improvement to which the present occasion is devoted. There is, it is true, great complaint that the recommendations and theories of scientific men are frequently of no value to the farmer, because they will not stand the test of experiment; and so practical agriculture, as it is called, is set infinitely above the speculations of learned theorists. Now the proposition is to establish schools in which the theoretical and practical are combined. Every new deduction of scientific research will be subjected to actual experiment, and tested by successful results, before it is patented for the public use and benefit. It is also fair to put the question within the recommendations of learned men, who oftener fail in experiment, than the suggestions of merely practical men. A person has only to read an agricultural paper containing the opinions of those who are fresh from the field—he has only to attend a meeting for dicussion in which he hears modes of tillage advocated by gentlemen who confidently lay claim to have put them to the proof of successive trial, and see how common it is for them to be in direct conflict with each other, and for one to overthrow what another asserts to have been established on the firmest foundations of experience, to be convinced that practice has its uncertainties as well as science. A hundred practical men will earnestly advocate a mode of agriculture which they have proved, by the demonstration of experiment, to be the best mode in the world, which a hundred other men, as experienced and wise as they, will in the same manner make it clear is of no value at all. If science and practice often disagree, neither does practice agree with practice. Practical men have no right to throw this imputation on science until they have wiped the reproach from themselves. If all the theologians of the United States were convened in one place to discuss their points of faith, and all the agriculturists to discuss their points of practice, I doubt whether it would not come out that there was nearly as much disagreement in the one assembly as in the other. This I confess to be a strong assertion. How much do practical men differ about the disease of the potato? There have been as many theories about the source of that extensive malady as have been broached respecting original sin; and what one recommends as an infallible specific, another declares, on the faith and knowledge of a practical man, to be inert and powerless. One objection to agricultural schools, which some assert with much confidence, is, that they will afford their advantages to but a portion of the people—they will not be democratic and diffusive enough in their influence, and while a few will be gathered within their walls to reap their fruits, the great mass of the people will be left unprovided for and unbenefited. In reply to this, it may be said that the number of schools of this description will be limited only by the patronage which the public are willing to afford them. They may be multiplied to as great a number as the demands of the people require, and if all the agricultural class choose to

enjoy the advantages of such institutions, they can provide themselves accordingly. The additional profit which they would soon be the means of conferring on tillage would afford the amplest means to erect and sustain them in sufficient numbers to meet all the wants of the community. But it is not to be expected, for the present at least, that any more than a portion of the agriculturists will feel an inclination to participate in the superior benefits of such establishments. Nevertheless, the whole mass of the people will be as really profited by comparatively few schools us though they were multiplied to a sufficient number to include every individual within their limits. Every part of the country will be represented by those who resort to them; and when they have completed their course of preparation, and retire to their respective homes to enter upon the pursuits which they have chosen, they will exhibit an example of correct and successful tillage which will excite curiosity, attract imitation, and raise the standard of agriculture in all their vicinities. Their new methods of cultivation, their communications with those around them, will stimulate inquiry, gradually diffuse correct and useful ideas, and extend the influence of the school in every part of the community. It is probable, also, that a multitude of useful publications will issue from the pens of those who are devoted to teaching agricultural science, which, popular in their form, will have extensive circulation; and thus, in one form or another, there will emanate from these institutions an influence which shall penetrate among the masses, and beneficially reach thousands who have never placed themselves within the sphere of their immediate operation. They will be so many lights, which will shed their rays not only upon those who are brought into immediate contact, but diffuse their beams abroad, illuminating remote places, finding their way into obscure recesses, and, in a thousand forms of direct emanation, and reflection, and refraction, pouring out their splendor to the utmost limits of the horizon.

3. Another advantage is, that they will give new attraction to agriculture as an employment. I have alluded to a class of young men who seek what they think to be a more elevated pursuit than the tillage of the field. They have an ambition of rising in life, and they very naturally conclude that the further they get from the ground the higher they fly. Those who unite a thirst for knowledge with aspiring views, and some who do not, are inclined to betake themselves to the university; and the door which admits them within its walls shuts out the vulgar toils of the field forever. It is a common observation, that the dullest boy in the family is selected to follow the father's pursuits on the ancestral grounds; while the one which appears most vivacious and active is singled out for the college, or some more tasteful, supposed dignified, vocation. Now, let the road to the best-conducted agriculture be through a scientific institution; let classes of youth go out annually from the tuition of learned instructors, versed in those sciences which are connected with the culture of the earth; let them enter upon the business of farming as young men enter the professions after graduation at the college, and it would contribute much to raise agriculture to that position which it ought to hold among the other vocations of life; and many who are now a burden to the professions, and are wrecked in the fluctuations of merchandise and commerce, would be found pursuing a safe, happy, and useful course of life. President Hitchcock saw, in

some of the agricultural schools which he visited in Europe, young men from families distinguished by their opulence and position in life habited in frocks, and performing cheerfully some of the most coarse and uncleanly labors connected with the establishment. Perhaps these individuals were drawn thither by the dignified associations which, in their view, science and education had thrown around their employments, and, in other circumstances, would have disdained such menial offices, as they would deem them, and have crowded into more elevated and congenial pursuits. Another desirable effect would follow: When commercial men in our large cities have acquired opulent fortunes, and are possessed of taste and fondness for display, they seek often to gratify their inclinations in costly equipages, works of art, and magnificent architecture. There is no objection to such expenditure when properly directed and bounded by reasonable limits. When men of great means divert a portion of their resources to the patronage of the arts, of statuary, and painting, and other products of genius and taste, they are devoting wealth to some of its noblest uses; they are counteracting the tendency which a close application to commercial occupations has to foster contracted and sordid propensities; they are imparting refinement and elevation to their own feelings, and contributing to diffuse, through a community sufficiently devoted to the love of gain, a healthful and liberalizing influence. But the taste for fine arts and magnificent display may become excessive and misdirected.

If some men of wealth, who now expend a hundred thousand dollars on the erection and fitting-up of a dwelling, would limit the outlay to fifty thousand, and reserve the remaining half to purchase some unproductive and waste land, whose tillage is too difficult and costly for persons of small means to undertake, on which to gratify their taste, and cover it with the beauty of a luxuriant and ornamental vegetation, they would contribute to the promotion of agricultural improvement, and at the same time indulge a taste as much nobler than that which they gratify now as the beauties of Nature transcend those of human device. Why is not a fine landscape as worthy an object of admiration as the painting which exhibits its imitation to the eye?—and why has not the Divine skill, which exhibits its wonders in the exquisite structure of plants, and the ornaments with which it gilds the flowers of the field, and the rich forms and foliage with which it invests the trees, as high claims to the homage of taste, and the expenditure of resources, as the art which hews the rock into the resemblance of the human form, but can confer no life to utter its expression through the rigid features? To a person whose susceptibilities of gratification are directed by right principles, the process by which a sterile and uninviting surface is converted into a rich and waving field, which causes the wilderness to blossom, and turns the foul morass into a smooth and verdant lawn, conveys as much pleasure as that which causes palaces to spring out of the rough stones of the quarry. There are those whose well-directed sentiments lead them in this direction; and the land which they have subdued to tillage, and adorned with loveliness, whilst it has been a noble monument to their taste and magnificence, has excited emulation, diffused more correct and useful ideas, and has been a subject of study and improvement to surrounding admirers. Some opulent men, of extensive information and liberal views, have, by their intelligent and advanced

modes of cultivation, conferred immense benefit on a large region. The spot which they have selected as the subject of their operations, and upon which they have bestowed their successful skill, has been a school a instruction to a whole community. In proportion as farming assumes of higher rank, and becomes invested with new attractions, such instances will be multiplied; and we shall see those splendid monuments of wealth and intelligence adorning the surface of the country.

Mr. Webster might have expended the funds which he has devoted to his farm of fifteen hundred acres at Marshfield to the erection of a splendid mansion in Boston. But the farm is a nobler monument to his republican and old Roman taste than would be a palace in the metropolis whose architecture should surpass all Grecian fame.

Lastly. As a necessary consequence, farming would become more productive and profitable, particularly in the old parts of the country.

I have alluded to the influence of slavery in this country in producing a constant deterioration of the soil. But the land has become much exhausted in the free States also. If, as it is confidently asserted, a thousand millions of dollars are required to repair the effect of injudicious and wasting culture, and to restore the lands to their original fertility, it is high time that an improved system should be introduced. Be it remembered that this deterioration has arrived at its present point under the labors of practical farmers, so called—those men of whom it has been said that they possess all the knowledge which is of any value to field culture. If the only valuable knowledge which we possess on this subject produces no better effects than these, then may we expect that the older regions of the country will cease to remunerate the cultivators, the rural districts of New England will become a wilderness and be abandoned to perpetual sterility, and the plodding labor which has drawn out the fine gold from her bald hills will be exchanged for a search after the dross of the California mountains. But the evil admits of a remedy. The downward process can be arrested and stopped at the point which it has reached. It is only for the community to awake to the nature and responsibilities of the crisis, and comprehend the right source of relief. It is only for the national and State governments to extend, in suitable ways, their fostering and efficient care to this great interest of the country, and aid in bringing the lights of profound research to the guidance of agricultural labor, and the same science which directs the track of the mariner in remote seas, and almost communicates the power of thought to the ponderous and ingenious machinery that executes the labors of millions of human hands, which has brought the poles of the earth together by rapidity of motion, and transmits ideas on the wires of lightning along nerves of steel, will cause vegetation to spring from arid sand, and convert the wilderness into a fruitful field, and that field into the garden of the Lord. Massachusetts has always been distinguished for that wise and liberal care which she has taken to develop the internal resources of the State and promote her prosperity. It is most earnestly to be hoped that she will not overlook that interest which constitutes the source and strength of all others—that contributes to the support and comfort of her citizens, and that the next legislature will give the crowning grace to all former splendid achievements, and respond to the loud voice which resounds from her remote borders, by lending its mighty aid to a system of agricultural education. You are assembled,

gentlemen, on another anniversary, with no signs of abatement in the interest which has attended former occasions. On this beautiful autumnal day, at the close of a favorable agricultural season, amidst the crowds which have come from all quarters of old Essex to exhibit their interest in your objects and proceedings, surrounded with the noblest specimens of industry and skill, you are prepared to render thanks to Him who has given the earth its fertility, rewards the labor of the husbandman, and has declared that seed time and harvest shall never fail. It is fit that, amidst these scenes of interest and congratulation, we should remember the dead. You miss one* from your assembly and counsels, who has long been a zealous and able coadjutor in your worthy object, and has given his most earnest thoughts and devotion to secure its highest prosperity. His wise and useful labors have been withdrawn from the interest which he loved so well, and whose magnitude he appreciated in its just light. You can show no higher honor to the dead than to promote, with undiminished zeal, that most noble enterprise to which he consecrated so much of his living energies. May all public and private duties be performed with such pure motives and faithful assiduity as to secure the gracious approbation of the Lord of the harvest and the Judge of the world!

PLAN FOR AN INDUSTRIAL UNIVERSITY.

BY PROF. J. B. TURNER, JACKSONVILLE, ILL.

There should be connected with such an institution, in this State [Illinois,] a sufficient quantity of land, of variable soil and aspect, or all its needful annual experiments and processes in the great interests of agriculture and horticulture.

Buildings of appropriate size and construction for all its ordinary and special uses; a complete philosophical, chemical, anatomical, and industrial apparatus; a general cabinet, embracing everything that relates to, illustrates, or facilitates any one of, the industrial arts; especially all sorts of animals, birds, reptiles, insects, trees, shrubs, and plants found in this State and the adjacent States.

Instruction should be constantly given in the anatomy and physiology, the nature, instincts, and habits of all animals, insects, trees, and plants; their laws of propagation, primogeniture, growth and decay, disease and health, life and death; on the nature, composition, adaptation, and regeneration of soils; on the nature, strength, durability, preservation, perfection, composition, cost, use, and manufacture of all materials of art and trade; on political, financial, domestic, and manual economy, (or the saving of labor of the hand,) in all industrial processes; on the true principles of national, contitutional, and civil law; on the true theory and art of governing and controlling, or directing the labor of men in the State, the family, shop, and farm; on the laws of vicinage, of the laws

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*Hon. Asa T. Newman, of Lynnfield, late a vice president of the Society.

of courtesy and comity between neighbors as such; and on the principles of health and disease in the human subject, so far, at least, as is needful for household safety; on the laws of trade and commerce, ethical, conventional and practical; on book-keeping and accounts; and, in short, in all those studies and sciences, of whatever sort, which tend to throw light upon any art or employment which any student may desire to master; or upon any duty he may be called to perform, or which may tend to secure his moral, civil, social, and industrial perfection, as a man.

No species of knowledge should be excluded, practical or theoretical; unless, indeed, those specimens of "organized ignorance," found in the creed of party politicians and sectarian ecclesiastics, should be mistaken by some for a species of knowledge.

Whether a distinct classical department should be added, or not, would depend on expediency. It might be deemed best to leave that department to existing colleges, as their more appropriate work, and to form some practical and economical connexion with them for that purpose; or it might be best to attach a classical department, in due time, to the institution itself.

To facilitate the increase and practical application and diffusion of knowledge, the professors should conduct, each in his own department, a continued series of *annual experiments*.

For example: let twenty or more acres of each variety of grain (each accurately measured) be annually sown, with some practical variation on each acre as regards the quality and preparation of the soil; the kind and quantity of seed; the time and mode of sowing or planting; the time, and modes, and processes of cultivation and harvesting, and an accurate account kept of all costs, labor, &c., and of the final results. Let analogous experiments be tried on all the varied products of the farm, the fruit-yard, the nursery, and the garden; on all modes of crossing, rearing, and fattening domestic animals, under various degrees of warmth and of light, with and without shelter; on green, dry, raw, ground, and cooked food, cold and warm; on the nature, causes, and cure of their various diseases, both of those on the premises and of those brought in from abroad; and advice given, and annual reports made on those and all similar topics. Let the professors of physiology and entomology be ever abroad at the proper seasons, with the needful apparatus for seeing all things visible and invisible, and scrutinizing the latent causes of all those blights, blasts, rots, rusts, and mildews which so often destroy the choicest products of industry, and thereby impair the health, wealth, and comfort of millions of our fellow-men. Let the professor of chemistry carefully analyze the various soils and products of the State, retain specimens, give instruction, and report on their various qualities, adaptations, and deficiencies.

Let similar experiments be made in all other interests of agriculture, and mechanic or chemical art, mining, merchandise, and transportation by water and by land, and daily practical and experimental instruction given to each student in attendance, in his own chosen sphere of research or labor in life. Especially let the comparative merits of all labor-saving tools, instruments, machines, engines, and processes be thoroughly and practically tested and explained, so that their benefits might be at once enjoyed, or the expense of their cost avoided by the unskilful and unwary.

It is believed by many intelligent men that from one-third to one-half the annual products of this State are annually lost from ignorance on the above topics. And it can scarcely be doubted that in a few years the entire cost of the whole institution would be annually saved to the State in the above interests alone, aside from all its other benefits, intellectual, moral, social, and pecuniary.

The apparatus required for such a work is obvious. There should be grounds devoted to a botanical and common garden; to orchards and fruit-yards; to appropriate lawns and promenades, in which the beautiful art of landscape gardening could be appropriately applied and illustrated; to all varieties of pasture, meadow, and tillage needful for the successful prosecution of the necessary annual experiments. And on these grounds should be collected and exhibited a sample of every variety of domestic animal, and of every tree, plant, and vegetable that can minister to the health, wealth, or taste and comfort of the people of the State; their nature, habits, merits, production, improvement, culture, diseases, and accidents, thoroughly scrutinized, tested, and made known to the students, and to the people of the State.

There should also be erected a sufficient number of buildings and out-buildings for all the purposes above indicated, and a repository, in which all the ordinary tools and implements of the institution should be kept, and models of all other useful implements and machines from time to time collected, and tested, as they are proffered to public use. At first it would be for the interest of inventors and venders to make such deposites. But, should similar institutions be adopted in other States, the general government ought to create in each State a general patent office, attached to the universities, similar to the existing deposites at Washington; thus rendering this department of mechanical art and skill more accessible to the great mass of the people of the Union.

I should have said, also, that a suitable industrial library should be at once procured, did not all the world know such a thing to be impossible, and that one of the first and most important duties of the professors of such institutions will be to begin to create, at this late hour, a proper practical literature, and series of text-books for the industrial classes.

As regards the professors, they should, of course, not only be men of the most eminent practical ability in their several departments, but their connexion with the institution should be rendered so fixed and stable as to enable them to carry through such designs as they may form, or all the peculiar benefits of the system would be lost.

Instruction, by lectures and otherwise, should be given mostly in the colder months of the year, leaving the professors to prosecute their investigations, and the students their necessary labor, either at home or on the premises, during the warmer months.

The institution should be open to all classes of students above a fixed age, and for any length of time, whether three months or seven years, and each taught in those peculiar branches of art which he wishes to pursue, and to any extent, more or less. And all should pay their tuition and board bills, in whole or in part, either in money or necessary work on the premises—regard being had to the ability of each.

Among those who labor, medals and testimonials of merit should be given to those who perform their tasks with most promptitude, energy, care, and skill; and all who prove indolent or ungovernable excluded

at first from all part in labor, and speedily, if not thoroughly, reformed from the institution itself; and here again let the law of nature, instead of the law of rakes and dandies, be regarded, and the true impression ever made on the mind of all around—that WORK ALONE IS HONORABLE, and indolence certain disgrace, if not ruin.

At some convenient season of the year, the commencement, or annual fair of the university, should be held through a succession of days. On this occasion the doors of the institution, with all its treasures of art and resources of knowledge, should be thrown open to all classes, and as many other objects of agricultural or mechanical skill, gathered from the whole State, as possible, and presented by the people for inspection and premium on the best of each kind; judgment being rendered, in all cases, by a committee wholly disconnected with the institution. On this occasion all the professors, and as many of the pupils as are sufficiently advanced, should be constantly engaged in lecturing and explaining the divers objects and interests of their departments. In short, this occasion should be made the great annual gala day of the institution, and of all the industrial classes, and all other classes in the State, for the exhibition of their products and their skill, and for the vigorous and powerful diffusion of practical knowledge in their ranks, and a more intense enthusiasm in its extension and pursuit.

As matters now are, the world has never adopted any efficient means for the application and diffusion of even the practical knowledge which does exist. True, we have fairly got the primer, the spelling-book, and the newspaper abroad in the world, and we think that we have done wonders; and so, comparatively, we have. But if this is a wonder, there are still not only wonders, but, to most minds, inconceivable miracles, from new and unknown worlds of light, soon to break forth upon the industrial mind of the world.

Here, then, is a general, though very incomplete, outline of what such an institution should endeavor to become. Let the reader contemplate it as it will appear when generations have perfected it, in all its magnificence and glory; in its means of good to man—to *all men of all classes*; in its power to evolve and diffuse practical knowledge and skill, true taste, love of industry, and sound morality—not only through its apparatus, experiments, instructions, and annual lectures and reports, but through its thousands of graduates in every pursuit in life, teaching and lecturing in all our towns and villages—and then let him seriously ask himself, is not such an object worthy of at least an effort, and worthy of a State which God himself, in the very act of creation, designed to be the first agricultural and commercial State on the face of the globe?

Who should set the world so glorious an example of educating their sons worthily of their heritage, their duty, and their destiny, if not the people of such a State? In our country we have no aristocracy, with the inalienable wealth of ages, and constant leisure and means to perform all manner of useful experiments for their own amusement; but we must create our nobility for this purpose, as we elect our rulers, from our own ranks, to aid and serve, not to domineer over and control us. And this done, we will not only beat England, and beat the world, in yachts, and locks, and reapers, but in all else that contributes to the well-being and true glory of man.

I maintain that, if every farmer's and mechanic's son in this State could now visit such an institution but for a single day in the year, it would do him more good in arousing and directing the dormant energies of mind than all the cost incurred, and far more good than many a six months of professed study of things he never need and never wants to know.

As things now are, our best farmers and mechanics, by their own native force of mind, by the slow process of individual experience, come to know at forty what they might have been taught in six months at twenty; while a still greater number of the less fortunate or less gifted stumble on through life almost as ignorant of every true principle of their art as when they begun. A man of real skill is amazed at the slovenly ignorance and waste he everywhere discovers on all parts of their premises; and still more to hear them boast of their ignorance of all "book farming," and maintain that "their children can do as well as they have done;" and it certainly would be a great pity if they could not.

The patrons of our university would be found in the former, not in the latter class. The man whose highest conception of earthly bliss is a log hut in an unenclosed yard, where pigs of two species are allowed equal rights, unless the four-legged tribe chance to get the upper hand, will be found no patron of industrial universities. Why should he be? He knows it all already.

There is another class of untaught farmers who devote all their capital and hired labored to the culture, on a large scale, of some single product which always pays well when so produced on a fresh soil, even in the most unskilful hands. Now, such men often increase rapidly in wealth, but it is not by their skill in agriculture, for they have none; their skill consists in the management of capital and labor; and deprive them of these, and confine them to the varied culture of a small farm, and they would starve in five years where a true farmer would amass a small fortune. This class are, however, generally the fast friends of education, though many a looker-on will cite them as instances of the uselessness of acquired skill in farming; whereas they should cite them only as a sample of the resistless power of capital even in comparatively unskilful hands.

Such institutions are the only possible remedy for a caste education, legislation, and literature. If any one class provide for their own liberal education in the State, as they should do, while another class neglect this, it is as inevitable as the law of gravitation that they should form a ruling caste or class by themselves, and wield their power more or less for their own exclusive interests and the interests of their friends.

If the industrial were the only educated class in the State, the caste power in their hands would be as much stronger than it now is as their numbers are greater. But now industrial education has been wholly neglected, and the various industrial classes left still ignorant of matters of the greatest moment pertaining to their vital interests; while the professions have been studied till trifles and fooleries have been magnified into matters of immense importance, and tornadoes of windy words and barrels of innocent ink shed over them in vain.

This, too, is the inevitable result of trying to crowd all liberal, practical education into one narrow sphere of human life. It crowds their ranks with men totally unfit by nature for professional service. Many of these,

under a more congenial culture, might have become, instead of the starving scavengers of a learned profession, the honored members of an industrial one. Their love of knowledge was indeed amiable and highly commendable; but the necessity which drove them from their natural sphere in life in order to obtain it is truly deplorable.

But such a system of general education as we now propose would, in ways too numerous now to mention, tend to increase the respectability, power, numbers, and resources of the true professional class.

Nor are the advantages of the mental and moral discipline of the student to be overlooked; indeed, I should have set them down as most important of all had I not been distinctly aware that such an opinion is a most deadly heresy; and I tremble at the thought of being arraigned before the tribunal of all the monks and ecclesiastics of the Old World, and no small number of their progeny in the New.

It is deemed highly important that all in the professional classes should become writers and talkers; hence they are so incessantly drilled in all the forms of language, dead and living, though it has become quite doubtful whether, even in their case, such a course is most beneficial, except in the single case of the professors of literature and theology, with whom these languages form the foundation of their professions and the indispensable instruments of their future art in life.

No inconsiderable share, however, of the mental discipline that is attributed to this peculiar course of duty arises from daily intercourse, for years, with minds of the first order in their teachers and comrades, and would be produced under any other course if the parties had remained harmoniously together. On the other hand, a classical teacher, who has no original, spontaneous power of thought, and knows nothing but Latin and Greek, however perfectly, is enough to stultify a whole generation of boys, and make them all pedantic fools like himself. The idea of infusing mind, or creating, or even materially increasing it by the daily inculcation of unintelligible words—all this awful wringing to get blood out of a turnip—will, at any rate, never succeed except in the hands of the eminently wise and prudent, who have had long experience in the process; the plain, blunt sense of the unsophisticated will never realize cost in the operation. There are, moreover, probably, few men who do not already talk more, in proportion to what they really know, than they ought to. This chronic diarrhœa of exhortation, which the social atmosphere of the age tends to engender, tends far less to public health than many suppose. The history of the Quakers shows that more sound sense, a purer morality, and a more elevated practical piety can exist, and do exist, entirely without it, than is commonly with it.

At all events, we find, as society becomes less conservative and pedantic, and more truly and practically enlightened, a growing tendency of all other classes, except the literary and clerical, to omit this supposed linguistic discipline, and apply themselves directly to the more immediate duties of their calling; and, aside from some little inconvenience at first, in being outside of caste, that they do not succeed quite as well in advancing their own interests in life, and the true interests of society, here is no sufficient proof.

Indeed, I think the exclusive and extravagant claims set up for ancient lore, as a means of disciplining the reasoning powers, simply ridiculous when examined in the light of those ancient worthies who

produced that literature, or the modern ones who have been most devoted to its pursuit, in this country and in Europe. If it produces infallible practicable reasoners, we have a great many thousand infallible antagonistic truths, and ten thousand conflicting paths of right, interest, duty, and salvation. If any man will just be at the trouble to open his eyes and his ears, he can perceive at a glance how much this evasive discipline really does, and has done, for the reasoning faculty of man, and how much for the power of sophistical cant, and stereotyped nonsense; so that, if obvious facts, instead of verbose declamation, are to have any weight in the case, I am willing to join issue with the opposers of the proposed scheme, even on the bare ground of its superior adaptation to develop the mental powers of its pupils.

The most natural and effectual mental discipline possible for any man arises from setting him to earnest and constant thought about the things he daily does, sees, and handles, and all their connected relations and interests. The final object to be attained with the industrial class is to make them *thinking laborers;* while of the professional class we should desire to make *laborious thinkers*—the production of goods, to feed and adorn the body, being the final end of one class of pursuits; and the production of thought, to do the same for the mind, the end of the other. But neither mind nor body can feed on the offals of preceding generations. And this constantly-recurring necessity of reproduction leaves an equally honorable, though somewhat different, career of labor and duty open to both; and, it is readily admitted, should and must vary their modes of education and preparation accordingly.

It may do for the man of books to plunge at once amid the catacombs of buried nations and languages, to soar away to Greece or Rome, or Nova-Zembla, Kamschatka, and the fixed stars, before he knows how to plant his own beans, or harness his own horse, or can tell whether the functions of his own body are performed by a heart, stomach, and lungs, or with a gizzard and gills.

But for the man of work thus to bolt away at once from himself and all his pursuits in after-life, contravenes the plainest principles of nature and common sense. No wonder such educators have ever deemed the liberal culture of the industrial classes an impossibility, for they have never tried, nor even conceived of, any other way of educating them, except that by which they are rendered totally unfit for their several callings in after-life. How absurd would it seem to set a clergyman to ploughing and studying the depredations of blights, insects, the growing of crops, &c., &c., in order to give him habits of thought and mental discipline for the pulpit! Yet this is not half as ridiculous, in reality, as the reverse absurdity of attemping to educate the man of work in unknown tongues, abstract problems and theories, and metaphysical figments and quibbles.

Some, doubtless, will regard the themes of such a course of education as too sensuous and gross to be at the basis of a pure and elevated mental culture. But the themes themselves cover all possible knowledge of all modes and phases of science, abstract, mixed, and practical. In short, the field embraces all that God has made, and all that human art has done; and if the created universe of God, and the highest art of man, are too gross for our refined uses, it is a pity the "morning stars and the sons of God" did not find it out as soon as the blunder was made. But, in my opinion, these topics are of quite as much conse-

quence to the well-being of man, and the healthful development of mind, as the concoction of the final nostrum in medicine, or the ultimate figment in theology and law, or conjectures about the galaxy or the Greek accent; unless, indeed, the pedantic professional trifles of one man in a thousand are of more consequence than the daily vital interests of all the rest of mankind.

But can such an institution be created and endowed? Doubtless it can be done, and done at once, if the industrial classes so decide. The fund given to this State by the general government, expressly for this purpose, is amply sufficient, without a dollar from any other source; and it is a mean, if not an illegal, perversion of this fund to use it for any other purpose. It was given to the people, the whole people of this State—not for a class, a party, or sect, or conglomeration of sects; not for common schools, or family schools, or classical schools; but for "a university," or seminary of a high order, in which should, of course, be taught all those things which every class of citizens most desire to learn—their own duty and business for life. This, and this alone, is a university in the true, original sense of the term. And if an institution which teaches all that is needful only for the three professions of law, divinity, and medicine is, therefore, a university, surely one which teaches all that is needful for all the varied professions of human life is far more deserving of the name and the endowments of a university.

COMMON SCHOOLS IN THE UNITED STATES.

There is no subject in which the American people have a deeper interest than in *common schools.* Believing that a few pages of this report cannot be better filled than by statistics and the remarks of eminent citizens relating to common-school education, we give place to the following:

Extract of the annual message of Governor George F. Fort to the Legislature of New Jersey, January 14, 1852.

Prompted, therefore, by the highest impulses of duty by our responsibility to our constituents, and to the cause of human improvement, let us heartily co-operate to place our common-school system on a basis which cannot be shaken, and thereon enact a superstructure of wisdom, learning, and truth—the admiration of the present and succeeding generations, which shall bid defiance to the assaults of ignorance and superstition, and endure as a monument of our successful devotion to the cultivation of the mind.

The proper training of the human intellect is a momentous work. Too much attention cannot be paid to judicious methods of improving it. One great source of unsuccessful tuition is found in the incompetency of teachers in our public schools. This evil, in some sections of the State, has been suffered to exist to a great extent. In the ordinary business of life we require experience and skill in the workman we em-

ploy. How much more do we need such qualifications in him whose duty it is to direct the first operations of the juvenile mind, and fit his responsible charge for an active participation in the great concerns of life!

It is questionable, however, whether the demand for competent teachers is not fully equal to the supply. To remedy the evil, it has been proposed to establish one or more normal schools for the scientific training of teachers to the work of teaching. This plan has been adopted in some States, and has been generally approved. Whether a due regard to our immediate wants, our fiscal ability, and the state of public opinion would justify their institution at this time, are questions worthy of due consideration.

Teachers' institutes are not liable to the same objections. Strongly impressed with their necessity, utility, and effectiveness, I have no hesitation in recommending suitable provisions for their encouragement. They would awaken an increased interest in public instruction, and rapidly and effectually diffuse information among teachers in the theory and practice of teaching, and the government and discipline of schools. The young and inexperienced teacher, and he who has grown old in error, would here receive lessons in relation to their duties, derived from the most correct sources, the result of the accumulated wisdom of numbers and years devoted to the science of teaching.

In November last I had the pleasure of being present at a teacher's institute, held at Somerville, in this State. It originated with the enterprising citizens of Somerset, who take a deep interest in educational progress. Gentlemen of eminent attainments in teaching took charge of the institute, which was composed of some *seventy* male and female teachers. The proceedings were interesting and instructive, and imparted much valuable information which could not fail to be beneficial to those engaged in them.

There has never been a period so propitious as the present for further legislative measure to promote *free schools*. I still entertain the views expressed on the occasion of assuming my official duties, in relation to increased distributions from the treasury for that purpose. I would recommend that *the revenue annually derived from our public works be wholly appropriated to the cause of education*. If to this be added the distribution from the school fund, it would, with the interest accruing from the surplus revenue, be sufficient in amount to establish free schools in every district in the State. To supply any deficiency which might exist in any township or district, a small sum, *per capita*, might be imposed for tuition.

Should the judgment of the legislature accord with mine in regard to this matter, it will become necessary to raise an annual tax for the support of the State government. With our increased population, wealth, and resources, an ample revenue for all ordinary purposes might be raised, without producing any sensible increase of the burdens of the people. This mode of meeting the wants of the government would produce greater economy in expenditure, and prevent the squandering of public money in enterprises of doubtful expediency.

II.

CULTIVATION OF SPECIAL CROPS.

CULTIVATION OF BASKET WILLOW IN THE UNITED STATES.

[From Hunt's Merchants' Magazine, Jan., 1852.]

GARRISON'S LANDING,
Putnam county, N. Y., Dec. 4, 1851.

SIR: Knowing something of your knowledge of the commercial affairs of the world, and of your desire to lay before your readers information calculated to benefit them, I have taken the liberty of addressing to you a few remarks touching the growth and cultivation of the ozier or basket willow.

From the best information I can obtain, there are from four to five millions of dollars' worth of willow annually imported into this country from France and Germany.

The price ranges from $1 to $1 30 per ton weight. The quantity imported may appear large, yet it is not sufficient for consumption. In view of this importation, and the large sums expended for willow, would it not be well for some of your wealthy readers and landholders to give a little attention to this subject. Loudon, in his *Arboretum*, (vol. 3,) gives an account and description of one hundred and eighty-three varieties of this plant.

Knowing nothing of botany, I will confine myself exclusively to the three kinds best adapted for basket-making, farming, tanning, and fencing.

The *Salix viminalis* is that specimen of all others best calculated for basket makers. An acre of this, properly planted and cultivated upon suitable soil, will yield at least two tons weight per year, costing about thirty-five dollars per ton for cultivating and preparing for market.

The importers discountenance the idea of cultivating it in this country, alleging as a reason that the flies will seriously damage the crop, and that labor is so high it will never pay.

To this I have to say that I have growing as good a quality of willow as is grown in any part of the world; that, from two acres cut last year, the proceeds, clear of expense, was the snug little sum of $333 75; and if any person requires stronger proof than this of the feasibility of growing willow profitably in this country, I can refer him to John Bevridge, esq., of Newburg, N. Y., and Dr. Charles W. Grant, M. D., of the same place, a practical botanist and thorough-going horticulturist, who has given much time and attention to this subject, and has the best and greatest variety of willow, and the largest quantity planted of any one in the United States. All his stock is imported, and in fine condition for propagating.

The people of England, like us at present, until the year 1808, relied entirely for their supply upon continental Europe. Their supply was cut off by the breaking out of the war between Great Britain and France, so that after that date they were compelled to rely upon their own crops, and

many associations in England offered large premiums on the best productions of willow.

The late Duke of Bedford, one of the best farmers and horticulturists of that day, gave much attention to the subject, which is rigorously prosecuted by his son, the present Duke, and brother of Lord John Russell. His grace had one specimen which is extensively planted in and about the Park at Wooburn Abbey, Wooburn, Bedfordshire. In England this plant is highly prized for its beauty, rapidity of growth, outgrowing all other trees, and giving a fine shade in two or three years. This is the *Salix alba*, or Bedford willow. The bark is held in high estimation for tanning; the wood for shoemakers' lasts, boot-trees, cutting-boards, gun and pistol stocks, and house timber; the wood being fine-grained, and susceptible of as fine a polish as rose-wood or mahogany. An acre of this kind of wood ten years old, has sold in England for 155 pounds.

The next species is the Huntington willow, or *Salix capua*, which is also a good basket willow, and is used extensively in England for hoop poles and fencing by the farmers. Their manner of planting, when for fencing, is by placing the ends of the cuttings in the ground, and then working them into a kind of trellis-work, and passing a willow withe around the tops or ends, so as to keep in shape for the first two years. They cut the tops off yearly and sell them to the basket-makers, thus having a fence and crop from the same ground.

Another description of fence is also made from the *Salix capua*, known in England by the name of hurdle fences, which may be removed at the pleasure or discretion of the proprietor.

The *Salix alba* is extensively used by retired tradesmen who build in the country, for the purpose of securing shade in a short time, and by the nobility around their fish-ponds and mill-dams, and along their water-courses and avenues. This is the principal wood used in the manufacture of gunpowder in England.

It has also been asserted by several English noblemen that their fish succeeded much better in ponds surrounded by willow (*Salix alba*) than in waters where other trees were contiguous.

The price of cuttings in England is as follows: one year old, £1; two years old, £2; three years old, £4; four years old, £5 10*s*; five years old, £6 10*s*.

For any kind of willow it requires about twelve thousand cuttings to plant one acre. Cuttings three years old will pay an interest the year after planting of about twenty-five per cent.; the second year of at least fifty; and by the fourth year the crop ought to yield about one and a half ton.

Capitalists are generally contented with an interest of ten per cent. per annum; while here is a business which will pay at least ten times that amount. There are hundreds of thousands of acres of land at present in this country not paying two and a half per cent. per annum, which might be planted with willow, and would yield an immense profit.

The facts stated by me are open to all who may think proper to investigate. We send clocks, corn, flour, shoes, and broom-corn to England, and I can see no reason why we cannot send willow there.

I am fully convinced that willow may be grown profitably in this country at $50 per ton weight. It may be asked and wondered why I do not go extensively into this business myself. The question is easily answered. I have not the capital, but am getting into it as fast as my lim-

ited means will permit. If I had the means, I would purchase lands and plant thousands of acres of willow, and find a ready market for it.

In conclusion, I have to say, that I have no cuttings for sale myself, but that I will cheerfully give any reasonable explanation to any inquiries by letter, post paid.

I am, dear sir, very respectfully, yours, &c.,

WILSON G. HAYNES.

FREEMAN HUNT, Esq.

NORTH CAROLINA GRAPES.

[From the Wilmington (N. C.) Herald, Nov. 10, 1851.]

We received a letter very recently from a gentleman of Fayetteville, propounding certain interrogatories respecting the Isabella, Catawba, and Scuppernong grapes, and, in pursuance of a suggestion therein contained, handed the letter above named to Dr. Togno, a gentleman of extensive research and practical knowledge upon the subject of the grape and its varieties, with the request that he would furnish us with an answer for publication. The Doctor has very kindly complied, and we take pleasure in presenting his communication to our readers. It will be found interesting and explanatory on many points. We must confess, however, our disappointment at the result of his convictions with regard to the origin of the Isabella grape. It appears that he has come to the conclusion that this grape is not a native of this State after all, but a European one, possessing all the characters of such, and none of those of an indigenous production.

This, we believe, runs counter to the general impression and belief prevailing for many years in this State and other sections of the country. The Isabella was always classed, unless we are greatly deceived, among the natural products of our soil; and we confess we are loth, at this late date, to yield up a point which robs North Carolina of the maternity of this delightful fruit. So many years have intervened, and authorities lost, that it is almost impossible at this time to arrive at a certain conclusion; it is at best a matter of probabilities and impressions. While, therefore, we do not advance our own opinion in opposition to that of scientific gentlemen like Drs. McRee and Togno, we are free to acknowledge that, in the absence of more conclusive proof, we prefer remaining under our original belief. The question has been narrowed down to two points—the Isabella is either a North Carolina or a foreign production; no other State can lay claim to it. We therefore trust that northern writers will hereafter remember this fact, and not locate this vine at different points in the Union, as heretofore. As a not unfitting sequence to the above, and while we are discoursing upon grapes, and the purposes to which they are employed, we may state that a bottle of wine made in the adjoining county of Columbus, from the ordinary fox-grape, as it is called, (a small grape in clusters growing in great luxuriance in the woods,) has been sent to our office. On a trial we found it mild and pleasant; it has an agreeable taste, a light body, and is free from intoxicating effect. Our donor designs the experiment of age upon its quality, and to ascertain hereafter if it retains its original taste, it having been intimated that it would

not. For our own part we do not see why good wines should not be made in this State, and become in time a profitable pursuit. Certainly we wish our esteemed friend, Dr. Togno, a full realization of his hopes, and a lucrative return for his labors at Diccoteaux, which presents, in its improved cultivation now, a striking contrast to its original wildness and unfruitfulness.

DICCOTEAUX, *November* 1, 1851.

DEAR SIR: In answer to the letter of your friend, Mr. J. M. Rose, of Fayetteville, North Carolina, communicated to me this day by you, I may briefly state, for his edification and his Ohio friend, that his queries are as many historical problems, not easily settled, owing to the blunders and confusion worse confounded of the writers in the various northern periodicals that have taken upon themselves to solve this moot-point—

> "Who, if they once grow fond of an opinion,
> They call it honor, honesty, and faith,
> And sooner part with life than let it go."—*Rowe.*

There is no doubt that the Skoupernong (Indian Sweet Water) is a native of the eastern portion of the State of North Carolina, and it is found wild in this region, as well as a purple variety commonly called with us Bullus. The Catawba, as its name designates, is also a native of this State, and it is to this day to be found wild on the Catawba river, in Lincoln county, and all over that neighborhood. I believe that it is from this locality that Mr. Adlum first obtained it in 1820, or thereabouts, and successfully cultivated it near Georgetown, D. C.

Mr. N. Longworth, of Cincinnati, in a letter to me, states of his having obtained the Catawba, that he now so successfully and profitably cultivates in that locality, from Mr. Adlum. I obtained last winter from Senator Hanks, of Lincoln county, cuttings of the "Lincoln grape," which, from the appearance of the wood, is neither more nor less than a synonym for the Catawba.

The history of the so-called "Isabella grape" is not so easily compassed, owing to diversity of opinion. I have taken great trouble to investigate its history, and, as yet, I have only obtained some links of this broken chain. And, first, is the "Isabella" a native or a foreign grape? Dr. James F. McRee, of this place, whose high scientific attainments and observations in the natural sciences impart to his opinion and statement of facts great certainty, and his testimony is entitled to great weight in setling this first question. He states that he distinctly remembers, as far back as 1810, when the Laspeyre grape (the *Isabella* of William Prince) was sold in the market of Wilmington by Mr. Laspeyre, who cultivated it in Bladen county, and that he perfectly remembers that Mr. Laspeyre had stated it to be a European variety, and not only sold it as such, but it was never doubted by Dr. McRee and others that the vine had all the characters of a European variety; and, what makes it still more certain, is, that even in this congenial climate it frequently rots, and did rot with the first cultivator of it. Mr. N. Longworth has entered the same complaint against it to me. Dr. McRee states also that he heard, as early as he can remember, that the said grape had been imported by Mr. Laspeyre, and that a Catalonian, having seen the grape here, claimed it as being a grape

common in Spain, his native country. Of course Dr. McRee has never considered the grape an indigenous one, but a European, possessing, as it does, all the characters of a European grape and none of our native grapes. This is also my own conviction. In the whole of this neighborhood the said grape is to be found in gardens, and everywhere its origin is referred to the liberal distribution of cuttings by Mr. Laspeyre; so that Mr. Laspeyre must have planted his grape-vines at least five years before he brought to this market his grapes from Bladen county. This would carry us back to 1805, a period far anterior to all the dates of the supposed cultivation of the "*Isabella*" mentioned by Mr. Allen in Mr. Downing's "Horticulturist."

These northern writers, doubting not, on a superficial examination of the case at many hundred miles distance from the scene, have undertaken to settle for the good people of the State of North Carolina that which, even *here* on the spot, has required the most assiduous diligence to ferret out the facts in the case; and even then, prudence and caution have caused me to be very circumspect how I come to a conclusion. So much for this point. Now for the history of the so-called "*Isabella*" grape:

On the authority and positive statement of Mr. R. W. Gibbs, son of Mr. R. Gibbs of this place, and nephew of Col. Geo. Gibbs, after whose wife (Mrs. Isabella Gibbs) the "Isabella" grape was named by Wm. Prince, he states that his father, Mr. R. Gibbs, at the time he purchased Woodford plantation on Cape Fear river, in Brunswick county, N. C., found a vine planted in the garden by the previous owner, which vine was taken up, root and branch, some time between 1810 and 1813, (he cannot positively say, but he knows that it must be at this time, as we shall soon see,) and sent to Col. Geo. Gibbs, who was then a merchant in New York, and who resided at Brooklyn, in whose garden he planted it. Soon after, (1815,) the narrator, Mr. R. W. Gibbs, then a boy, was sent to school at Brooklyn, and resided with his uncle two and a half years, and found the vine there in a flourishing condition, and he helped to take care of it every winter by laying it down and covering it with earth, &c. When General Swift inhabited the same house he still found the vine in the garden, and it is there that Mr. Wm. Prince first saw the vine, and named and propagated it, as he himself has published. So far so good; but still the identity of the stock sent to Brooklyn and the Laspeyre grape is not completely made out, except in their general resemblance and habits; and the still greater reason of their identity is, that the "*Isabella*" had its origin in a county where the Laspeyre grape was in very great repute, and was very generally cultivated at that time.

Comte Odart, in his celebrated work on the description and classification of the known grape vines in the world, alluding to the "Isabella," says: "Although the presidents of several vineyardist congresses have called it excellent, and have recommended its cultivation, and though the Marquis Ridolfi, a distinguished agriculturist and director of an agricultural institute in Tuscany, has praised its supposed advantages, I still unite with many French vineyardists who think, like myself, that this grape, with a flat and medicinal taste, is good for nothing, neither for making wine nor for the table. However, we cannot deny to it the advantage of being pretty productive.

"But here is one more recommendable—we mean the Katawba, which is easily known by its berries, very slightly red; and its taste has a peculiar and agreeable flavor, slightly vinous. In this respect it is much preferable to the 'Isabella,' which has been brought from the same country.

"The Katawba has appeared to me rather unproductive, and its grapes do not reach so easily their maturity as those of the stocks of this chapter, though it blooms first. Its bunches, slightly elongated, are rather fine, and keep a long time; the berries are covered with bloom, which deadens its red color; they are big, round, and well spaced. Its wood is of a uniform reddish-brown color; its leaves large, round, curling under, and their under surface is cottony, which imparts to it a white color."

Be it as it may, one of two things of this dilemma must be true; and this is an important conclusion in either case, namely: that, if we suppose it a European variety, it goes to prove that some kinds of European vines can be acclimated and naturalized in this country. If, on the other hand, we consider the Isabella to have originated from one of our native vines, its present improved condition gives great hope of being able to improve our native stocks by long-continued and careful cultivation. I do not come to this conclusion from one or two isolated facts, but from the positive knowledge of eye witnesses and undeniable documents. A solitary fact, here and there, without connexion, would only lead us into error, as was the case with Mr. Allen in the "Horticulturist," noticed by you. It is only by a continuous series and combination of facts that we can positively arrive at the truth of anything. I have tried my best to obtain the candid truth of this case. I am convinced that the related facts are entirely satisfactory.

Your friend,

JOSEPH TOGNO,
Wilmington Vine-Dresser Model School.

Mr. Burr.

CAMELINA SATIVA—A NEW OIL PLANT.

This is a curious plant, usually enumerated among our indigenous plants, though—as it does not long propagate itself with us spontaneously, and is found only in cultivated fields, chiefly among flax, with whose seeds it is often introduced from abroad—there is good ground for presuming that it is not in reality a native.

In some parts of the world it is cultivated for its stems, which yield a fibre applicable for spinning and for its oleiferous seeds. Merat and DeLans say that it is cultivated for these purposes in Flanders.

These seeds are sometimes called sesamum seeds, *(semina Sesami vulgaris,)* but they must not be confounded with the genuine sesamum or teel seeds, the produce of *Sesamum orientale*.

Mr. William Taylor, F. L. S., has recently drawn the attention of agriculturists and others to the *Camelina sativa* as an oil plant, adapted for feeding cattle, and for other purposes. He says that the soils best adapted for its cultivation are those of a light nature; but a crop will never fail on land of the most inferior description. It has been found

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to flourish this year on barren sandy soils, where no other vegetable would grow; and, independent of the drought, the plants have grown most luxuriantly, yielding a large and certain crop. When grown upon land that has been long in tillage and well farmed, the crop will be most abundant. The best time for putting in the seed is as early as possible in the spring months—say from the middle of March or the middle of April to June, and for autumn sowing in August; and the quantity per acre required fourteen pounds, and may be either drilled or broadcast, but the drilled method should be preferred. If drilled, the rows must be twelve inches apart.

As soon as the plants have grown five or six inches high, a hand or horse-hoe may be used to cut up the weeds between the rows, and no further culture or expense will be required.

If sown early, two crops may frequently be obtained in one year, as it is fit for harvesting in three months after the plant makes its first appearance. Or another important advantage may be obtained: if seed is sown early in March, the crop will be ready to harvest in the beginning of July, and the land fallowed for wheat or spring corn; also, when barley or small seeds cannot be sown sufficiently early, this may be put in with great success. It is a plant that may be cultivated after any corn crop, without doing the least injury to the land, and may be sown with all sorts of clover; the leaves of the gold of pleasure, being particularly small, afford an uninterrupted growth to any plant beneath it; and, the crop being removed early, the clover has time to establish itself.

The grower of this invaluable production is in all seasons secure of his crop, inasmuch as it is not subject to damage by spring frosts, heavy rains, and drought, and, above all, the ravages of insects, more particularly the cabbage-plant louse, *(aphis brassica,)* which so frequently destroys rape, turnips, and others belonging to the cruciferæ order, when coming into blossom. The seed is ripe as soon as the pods change from a green to a gold color. Care must then be taken to cut it before it becomes too ripe, or much seed may be lost. When cut with a sickle, it is bound up in sheaves and shocked in the same manner as wheat. The process of ripening completed, it is stacked, or put in a barn and threshed out like other corn. The expense of these crops cannot be very great either in the preparation and culture of the land or in the management in securing the produce afterwards; but, when grown with care and in good season, the produce will mostly be very abundant, as high as thirty-two bushels and upwards to the acre.

The cultivation of this plant for the seed would repay the farmer. An abundance of chaff would be produced, which would be of infinite service for horses or for manure; but in a grazing country like England, where vast sums are annually expended for foreign oil-cake, the gold of pleasure will soon be found an excellent substitute under manufacture, and consequently a grower would find a good remuneration on cultivating the seed.

The plant may be considered a valuable production of the earth. A fine oil is produced for burning in lamps, in the manufacture of woollen goods, in the manufacture of soaps, for lubricating machinery, and for painters. The oil-cake has been found highly nutritious in the fattening of oxen and sheep, as it contains a great portion of mucilage and

nitrogenous matter, which, combined together, are found very beneficial in developing fat and lean.

From the experiments above related, it is abundantly proved that it does not suffer from the severest frosts, its foliage not being injured. It is not infested by insects, nor does it exhaust the soil. The gold of pleasure has been cultivated by several practical agriculturists, who highly approve of the new plant. For all these reasons, it is to be hoped that every farmer will avail himself of this valuable discovery as a remunerating rotation crop.

Mr. Taylor adds that one acre, cultivated with these plants, yields thirty-two bushels of seed, from which 540 pounds of oil are obtained; so that the camelina seems to exceed the flax in its produce of seed, oil, and cake per acre. The seed is extremely rich in nutriment. I know of no seed superior to it for feeding cattle. The oil obtained by expression is sweet and excellent, especially for purposes of illumination. From the very small quantity of inorganic matter in the seed, it will be evident that the seed cake must be of a very nutritious character, being merely the seed deprived of a portion of its water and oily matter.

We have examined some of the oil obtained from the seeds of the camelina sativa, and which has been recently sent to several medical men by Mr. Taylor, under the belief that it possesses valuable medicinal properties. It is of a yellow color, and smells something like linseed oil. Finding it beneficial in relieving the incessant cough and retching of a cat, Mr. Taylor has extended its use to the human subject, and states that it has done a "world of good," and cured several persons afflicted with diseased lungs and asthma.—*Phar. Journal.*

CULTIVATING FORESTS.

At a recent sitting of the French Academy of Sciences, M. Chevandier developed a portion of the results of five years' study and experiments upon the *manuring of forests*, and the augmentation of their annual yield. This question has an interest in France which can hardly be understood in America, where the difficulty is rather to clear the ground of its woody growth than to stimulate it to greater fruitfulness. M. Chevandier commenced his experiments in 1847, believing it as possible to assist trees in their growth as flowers, grass, and annual plants. Why could not art interfere to restore to the soil the mineral substances withdrawn from it by the roots of the trees, and by them conveyed to their trunks and branches? Because woods spring up of themselves, and appear to flourish without the aid of man, was it not, nevertheless, probable that a system of amelioration of the soil might urge them to a more luxuriant vegetation? The great difficulty in the way of such attempts was the length of time necessary to devote to them. When Franklin wished to convince his fellow-citizens of the good effects of plaster of Paris upon soil deficient in lime, he simply sprinkled in the midst of a meadow a quantity of powdered plaster, tracing several words in huge letters. A few weeks afterwards the lime had sunk into the soil, but the words traced upon the meadow stood out from the rest by the richer

color and the double height of the vegetation. But, in order to convince oneself in silviculture that such or such a manure or substance acts favorably or otherwise, study for whole years, and application of the system to a very large extent of land, were indispensable. After five years' steady devotion to this specially, M. Chevandier communicated the substance of his discoveries to the academy. He commenced his experiments by choosing, among the substances that cheapness rendered accessible, such as could restore to the soil the elements of the azote or salt withdrawn from it for the support of the forest. As sources of azote, he employed the salts of ammonium; as sources of mineral substances, he used wood ashes, which contain the whole mineral portion of the wood before its combustion. He also tried lime, the salts of potash and of soda, the phosphate of bone-lime, plaster, and the sulphate of iron; and earthy substances, the residue of factories, of salts of potash and soda, *(oxy sulphuret of calcium,)* which had already been, and with advantage, tried in the valleys of the Vosges. It would be impossible to transcribe the tabular view drawn up by M. Chevandier, which gives the individual history and the bill of health of 5,530 subjects—pines, cedars, oaks, beeches, larches, &c., &c. I have only room for the general conclusions, which may be divided into four categories:

1st. Substances whose fertilizing action was more or less marked. These were the oxy-sulphuret of calcium, the chlorohydrate of ammonia, plaster of Paris, wood ashes, sulphate of ammonia, lime, non-calcined bones, and proudrette.

2d. Substances whose fertilizing effect was slightly marked or doubtful. These were the carbonate of potash, coagulated blood, calcined bones, an equal mixture of nitrate of potash, non calcined bones, sulphate of iron, and carbonate of lime, and an equal mixture of nitrate of potash and non-calcined bones.

3d. Substances which seemed to have no effect at all—the carbonate of soda, the nitrate of potash, and sea salt.

4th. Substances which seemed to have had an injurious effect—the sulphate of iron, and equal mixtures of sulphate of iron with lime, or of sulphate of iron with carbonate of lime.

The residuum of soda and potash works, known by the name of the oxy-sulphuret of calcium, generally supposed to be utterly useless, has been proved by M. Chevandier's experiments to be the most wonderful substance ever employed for fertilizing purposes. It augments the growth of forests over 100 per cent. In the neighborhood of soda works there are huge piles of it, the accumulation of years. At Marseilles it is thrown into the sea, while there are, throughout the department, vast pine plantations upon which it might be applied with great advantage.

ON THE TALLOW TREE.

[Communicated by the author in a letter from Ningpo, China, to the Commissioner of Patents.]

Uses of the Stillingia Sebifera, or Tallow Tree, with a notice of the Pe-la, or Insect-wax, of China. By D. J. Macgowan, M. D., Corresponding Member of the Agricultural and Horticultural Society of India.

The botanical characters of this member of the *Euphorbiaceæ* are too well known to require description, but hitherto no accurate account has

been published of its varied uses; and, although it has become a common tree in some parts of India and America, its value is appreciated only in China, where alone its products are properly elaborated.

In the American Encyclopædia, it is stated that this tree is almost naturalized in the maritime parts of South Carolina, and that its capsules and seeds are crushed together and boiled, the fatty matter being skimmed as it rises, hardening when cool.

Dr. Roxburgh, in his excellent *Flora Indica*, says: "It is now very common about Calcutta, where, in the course of a few years, it has become one of the most common trees. It is in flower and fruit most part of the year. In Bengal it is only considered an ornamental tree. The sebaceous produce of its seeds is not in sufficient quantity, nor its quality so valuable as to render it an object worthy of cultivation. It is only in very cold weather that this substance becomes firm; at all other times it is in a thick, brownish, fluid state, and soon becomes rancid. Such is my opinion of the famous vegetable tallow of China."

Dr. Roxburgh was evidently misled in his experiments by pursuing a course similar to that which is described in the Encyclopædia Americana, (and in many other works,) or he would have formed a very different opinion of this curious material. Analytical chemistry shows animal tallow to consist of two proximate principles—*stearine* and *elaine*. Now, what renders the fruit of this tree peculiarly interesting is the fact that both these principles exist in it separately in nearly a pure state. By the above-named process, stearine and elaine are obtained in a *mixed* state, and consequently present the appearance described by Roxburgh.

Nor is the tree prized merely for the stearine and elaine it yields, though these products constitute its chief value; its leaves are employed as a black dye; its wood, being hard and durable, may be easily used for printing-blocks and various other articles; and, finally, the refuse of the nut is employed as fuel and manure.

The *Stillingia sebifera* is chiefly cultivated in the provinces of Kiangsi, Kongnain, and Chehkiang. In some districts near Hangchan, the inhabitants defray all their taxes with its produce. It grows alike on low alluvial plains and on granite hills, on the rich mould at the margin of canals and on the sandy sea-beach. The sandy estuary of Hangchan yields little else. Some of the trees at this place are known to be several hundred years old, and, though prostrated, still send forth branches and bear fruit. Some are made to fall over rivulets, forming convenient bridges. They are seldom planted where anything else can be conveniently cultivated—in detached places, in corners about houses, roads, canals, and fields. Grafting is performed at the close of March or early in April, when the trees are about three inches in diameter, and also when they attain their growth. The *Fragrant Herbal* recommends for trial the practice of an old gardener, who, instead of grafting, preferred breaking the small branches and twigs, taking care not to tear or wound the bark.

In mid-winter, when the nuts are ripe, they are cut off with their twigs by a sharp crescentric knife, attached to the extremity of a long pole, which is held in the hand and pushed upwards against the twigs, removing at the same time such as are fruitless. The capsules are gently pounded in a mortar to loosen the seeds from their shells, from which they are separated by sifting. To facilitate the separation of the

white sebaceous matter enveloping the seeds, they are steamed in tubs, having convex open wicker bottoms, placed over caldrons of boiling water. When thoroughly heated, they are reduced to a mash in the mortar, and thence transferred to bamboo sieves, kept at a uniform temperature over hot ashes. A single operation does not suffice to deprive them of all their tallow; the steaming and sifting are therefore repeated. The article thus procured becomes a solid mass on falling through the sieve; and, to purify it, it is melted and formed into cakes for the press. These receive their form in bamboo hoops, a foot in diameter and three inches deep, which are laid on the ground over a little straw. On being filled with the hot liquid, the ends of the straw beneath are drawn up and spread over the top, and, when of sufficient consistence, are placed with their rings in the press. This apparatus, which is of the rudest description, is constructed of two large beams placed horizontally, so as to form a trough capable of containing about fifty of the rings with their sebaceous cakes; at one end it is closed, and at the other it is adapted for receiving wedges, which are successively driven into it by ponderous sledge-hammers wielded by athletic men. The tallow oozes, in a melted state, into a receptacle below, where it cools. It is again melted and poured into tubs smeared with mud to prevent its adhering. It is now marketable, in masses of about eighty pounds each, hard, brittle, white, opaque, tasteless, and without the odor of animal tallow. Under high pressure it scarcely stains bibulous paper; melts at 104° Fahrenheit. It may be regarded as nearly pure stearine; the slight difference is doubtless owing to the admixture of oil expressed from the seed in the process just described. The seeds yield about eight per cent. of tallow, which sells for about five cents per pound.

The process for pressing the oil, which is carried on at the same time, remains to be noticed; it is contained in the *kernel* of the nut, the sebaceous matter, which lies *between* the *shell* and the *husk*, having been removed in the manner described. The kernel, and the husk covering it, is ground between two stones, which are heated to prevent clogging from the sebaceous matter still adhering. The mass is then placed in a winnowing machine precisely like those in use in western countries. The chaff being separated, exposes the white oleaginous kernels, which, after being steamed, are placed in a mill to be mashed. This machine is formed of a circular stone-groove, twelve feet in diameter, three inches deep, and about as many wide, into which a thick solid stone wheel, eight feet in diameter, tapering at the edge, is made to revolve perpendicularly by an ox harnessed to the outer end of its axle, the inner turning on a pivot in the centre of the machine. Under this ponderous weight the seeds are reduced to a mealy state, steamed in the tubs, formed into cakes, and pressed by wedges in the manner above described; the process of mashing, steaming, and pressing being repeated with the kernels likewise.

The kernels yield above thirty per cent. of oil. It is called *ising-yu*, sells for about three cents per pound, answers well for lamps, though inferior for this purpose to some other vegetable oils in use. It is also employed for various purposes in the arts, and has a place in the Chinese Pharmacopœia, because of its quality of changing gray hair black, and other imaginary virtues. The husk which envelopes the kernel, and the shell which encloses them and their sebaceous covering, are

used to feed the furnaces, scarcely any other fuel being needed for this purpose. The residuary tallow-cakes are also employed for fuel, as a small quantity of it remains ignited a whole day. It is in great demand for chafing-dishes during the cold season, and, finally, the cakes which remain after the oil has been pressed out are much valued as a manure, particularly for tobacco fields, the soil of which is rapidly impoverished by the Virginian weed.

Artificial illumination in China is generally procured by vegetable oils; but candles are also employed by those who can afford it, and for lanterns. In religious ceremonies no other material is used. As no one ventures out after dark without a lantern, and as the gods cannot be acceptably worshipped without candles, the quantity consumed is very great. With an unimportant exception, the candles are always made of what I beg to designate as vegetable stearine.

When the candles, which are made by dipping, are of the required diameter, they receive a final dip into a mixture of the same material and insect-wax, by which their consistency is preserved in the hottest weather. They are generally colored red, which is done by throwing a minute quantity of alkanet-root (*Anchusa tinctoria*, brought from Shang-tung) into the mixture. Verdigris is sometimes employed to dye them green. The wicks are made of rush, coiled round a stem of coarse grass, the lower part of which is slit to receive the *pim* of the candlestick, which is more economical than if put into a socket. Tested in the mode recommended by Count Rumford, these candles compare favorably with those made from spermaceti, but not when the clumsy wick of the Chinese is employed. Stearine candles cost about eight cents the pound.

Prior to the thirteenth century, beeswax was employed as a coating for candles; but about that period the white-wax insect was discovered; since which time that article has been wholly superseded by the more costly but incomparably superior product of this insect. It has been described by Abbé Grossier, Sir George Staunton, and others; but those accounts differ so widely amongst themselves, as well as from that given by native authors, as to render further inquiry desirable. From the description given by Grossier, entomologists have supposed the insect which yields the *pe-la*, or white wax, to be a species of *coccus*. Staunton, on the contrary, describes it as a species of *cicada (Flata limbata.)* As described by Chinese writers, however, it is evidently an *apterous* insect; hence the inference either that there are two distinct species which produce white wax, or that the insect Staunton saw was falsely represented as the elaborator of this beautiful material.*

This, like many other interesting questions in the natural history of this portion of the globe, must remain unsolved until restrictions on

* A few particulars regarding the Himalayah wax-insect, (*Flata limbata*,) by Capt. Hutton, are published in the Journal of the Asiatic Society of Bengal, vol. xii. After alluding to Sir George Staunton's and the Abbé Grossier's account of the wax-yielding insect of China, and to various authorities, Captain Hutton observes: "From all these statements, therefore, we arrive at the positive conclusion, that, as this deposite (the deposite of *F. limbata*) will neither melt on the fire *per se*, nor combine with oil, it cannot be the substance from which the famous white wax of China is formed; and we are led to perceive, from the difference in the habits of the larva of *Flata limbata*, and that of the insect mentioned by the Abbé Grossier, that the wax is rather the produce of a species of *coccus* than of the larva of *F. limbata*, or even of the allied *F. nigricornis*."

foreign intercourse are greatly relaxed, or wholly removed. In the mean time, native writers may be consulted with advantage. It is from the chief of these—the Puntsau and the Kiangfangpu, two herbals of high authority—the subjoined account has been principally derived.

The animal feeds on an evergreen shrub or tree—*Ligustrum lucidum**—which is found throughout Central China, from the Pacific to Thibet; but the insect chiefly abounds in the province of Sychuen. It is met with, also, in Bunan, Hunan, and Hupeh. A small quantity is produced in Kinhwa, Chehkiang province, of a superior description. Much attention is paid to the cultivation of this tree; extensive districts of country are covered with it; and it forms an important branch of agricultural industry. In planting they are arranged like the mulberry, in rows about twelve feet apart; both seeds and cuttings are employed. If the former, they are soaked in water in which unhusked rice has been washed, and their shells pounded off. When propagated by cuttings, branches an inch in diameter are recommended as the most suitable size. The ground is ploughed semi-annually, and kept perfectly free from weeds. In the third or fourth year they are stocked with the insect. After the wax, or insect, has been gathered from the young trees, they are cut down just below the lower branches, about four feet from the ground, and well manured. The branches which sprout the following season are thinned, and made to grow in nearly a perpendicular direction. The process of cutting the trunk within a short distance of the ground is repeated every four or five years, and, as a general rule, they are not stocked until the second year after this operation. Sometimes the husbandman finds a tree which the insects themselves have attained; but the usual practice is to stock them, which is effected in spring with the nests of the insects. These are about the size of a "fowl's head," and are removed by cutting off a portion of the branch to which they are attached, leaving an inch each side of the nest. The sticks, with the adhering nests, are soaked in unhusked rice-water for a quarter of an hour, when they may be separated. When the weather is damp or cool, they may be preserved in jars for a week; but if warm, they are to be tied to the branches of the trees, to be stocked without delay, being first folded between leaves. By some the nests are probed out of their seat in the bark of the tree, without removing the branches. At this period they are particularly exposed to the attacks of birds, and require watching.

In a few days after being tied to the tree, the nests swell, and innumerable white insects, the size of "nits," emerge, and spread themselves on the branches of the tree; but soon, with one accord, descend towards the ground, where, if they find any grass, they take up their quarters. To prevent this, the ground is kept quite bare; care being taken also that their implacable enemies, the ants, have no access to the tree. Finding no congenial resting-place below, they re-ascend, and fix themselves to the lower surface of the leaves, where they remain several days, when they repair to the branches, perforating the bark to feed on the fluid within.

From "nits" they attain the size of "*Pediculus homi.*" Having compared them to this, the most familiar to them of all insects, our authors

* The Himalayah insect is not confined to a *ligustrum.*

deem further description superfluous. Early in June the insects give to the trees the appearance of being covered with hoar frost, being "*changed into wax;*" soon after this they are scraped off, being previously sprinkled with water. If gathering be deferred till August, they adhere too firmly to be easily removed. Those which are suffered to remain to stock trees the ensuing season secrete a purplish envelope about the end of August, which at first is no larger than a grain of rice; but as incubation proceeds, it expands and becomes as large as a fowl's head, which is in spring, when the nests are transferred to other trees, one or more to each, according to their size and vigor, in the manner already described.

On being scraped from the trees, the crude material is freed from its impurities—probably the skeleton of the insect—by spreading it on a strainer, covering a cylindrical vessel, which is placed in a caldron of boiling water. The wax is received into the former vessel, and on congealing is ready for market.

The *pe-la*, or white wax, in its chemical properties, is analogous to purified beeswax, and also spermaceti, but differing from both; being, in my opinion, an article perfectly SUI GENERIS. It is perfectly white, translucent, shining, not unctuous to the touch, inodorous, insipid, crumbles into a dry inadhesive powder between the teeth, with a fibrous texture resembling fibrous feldspar; melts at 100° Fah.; insoluble in water; dissolves in essential oil; and is scarcely affected by boiling alcohol, the acids, or alkalies.

The aid of analytical chemistry is needed for the proper elucidation of this most beautiful material.* There can be no doubt that it would prove altogether superior in the arts to purified beeswax. On extraordinary occasions, the Chinese employ it for candles and tapers. It has been supposed to be identical with the white wax of Madras; but as the Indian article has been found useless in the manufacture of candles, (Dr. Pearson, Philosophical Transactions, vol. 21,) it cannot be the same. It far excels also the vegetable wax of the United States, (*Myrica cerifera.*)

Is this substance a secretion? There are Chinese who regard it as such; some representing it to be the *saliva*, and others the excrement, of the insect. European writers take nearly the same view; but the best authorities expressly say that this opinion is incorrect, and that the animal is changed into wax. I am inclined to believe the insect undergoes what may be styled aceraceous degeneration; its whole body being permeated by the peculiar product in the same manner as the *coccus cacti* is by *carmine*.

It costs at Ningpo from 22 to 35 cents per pound. The annual product of this humble creature in China cannot be far from 400,000 pounds, worth more than 100,000 Spanish dollars.

NINGPO, *August*, 1850.

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* Some interesting particulars on this subject are contained in a Memoir in the Philosophical Transactions for 1848, by Mr. B. C. Brodie, entitled, "On the Chemical Nature of a Wax from China." Mr. Brodie states that, although in appearance the substance resembles stearine or spermaceti more than beeswax, it comes nearest to purified *cerin!* The *Comptes Rendus* for 1840, tome x, p. 618, contains a communication by M. Stanislas Julien on the China wax, and the insect which yields it. The wax insects are there stated to be raised from three species of plants: these are *Niu-tching*, (*Rhus succedanea,*) *Tong-tsing*, (*Ligustrum glabra,*) and the *Choui-kin*, supposed to be a species of *Hibiscus*. *Rhus succedanea*, or a nearly allied species, occurs in the Himalayah.

CULTURE AND PREPARATION OF SUMACH.

PALERMO, *May* 30, 1850.

DEAR SIR: In reply to your letter of yesterday's date, on the subject of the mode of cultivation of *sumach* in Sicily, I beg to submit the following remarks:

Sumach is an article of commerce of great importance to the Sicilians, as it is also with the Americans. And it is my opinion that this article, so valuable for manufacturing purposes, for tanning, &c., can be produced in the United States in sufficient quantity to *supply the world*, if the mode of its culture be understood and proper attention be paid to it. I have no doubt that it is the same kind that grows in the United States, which *there* runs to the size of trees. In Sicily they plant the roots or small plants from two to three feet apart, not always in regular rows, as we do Indian corn; hills about three feet apart, rows about four, so that the plough or harrow can save the hand labor of the hoe. They hoe it two or three times before the rains finish in May, and gather it in July and August. The leaves are the only parts made use of. After being separated from the twigs by threshing, (or in this country both ways—by threshing and by treading off with oxen or horses,) the leaves are then ground to the state of fineness in which you see it in the United States, being passed through sieves or bolting-cloths of sufficient fineness, and put into bags of one hundred and sixty pounds each.

The proper season for planting the roots or plants is in November, December, and January. When the season is rainy, the plants take root better. The root or stump is cut off from four to six inches above ground. The scions or sprouts spring up four to six out of each root; and when at maturity, which in this island is in July or August, they are all cut off at the stump, and laid in small handfuls (not spread out much, as the sun will turn the leaves yellow) to dry—say for a day or so—great care being taken that no rain falls on them. Perhaps in this country it may answer to plant nearer together than would be advisable in America, on account of the greater heat of the sun here, and thus shade the ground better.

The leaves are ground in mills mostly by horse-power; but water or steam power would be much cheaper and better. The perpendicular running stones weigh nearly three thousand pounds; they run double or single round an upright shaft. The nether or foundation stone is heavier and one-third greater in diameter than the running stones. The grinding surface of these latter is slightly rough, being occasionally touched with the pick or cold chisel. Hard granite stones answer; here they use a volcanic stone, which is as hard as marble. There follows round the running stones a little piece of wood, that keeps the leaves always under the stones. When ground fine enough, it is sifted or bolted in a large tight room, with a door to enter and fill the bags. In Sicily the article is more or less adulterated with spurious stuff, such as other kinds of leaves, and an article called *brucca*, which resembles the juniper bush in New England; this has no value in itself.

I believe the first year they do not cut off the sprouts. In the second and following years a curious freak of nature produces a single plant a foot or so distant from the original root; and this little plant it is which

they usually make use of to transplant. Now the plough or harrow would prevent these from growing, as they would be in the track; and this may be the reason why they hoe it. Still I think the plough or harrow must be used in our country, and some way or other contrived to save these little plants, if wanted. I would recommend you to let me engage to begin with this mode of cultivating sumach. Let one or two young Sicilian farmers be hired to go to Virginia for two or three years, who understand the cultivation not only of sumach, but also of lemons, oranges, grapes, and olives, as well as other productions of Sicily. Their wages in Sicily are from twenty-five to thirty-three cents per day, and find themselves; it should perhaps be half a dollar a day in the United States. Their passage to the United States would be about $25, or a little over; or perhaps our Government would deem it of importance enough to give them a passage either in a merchant or a United States vessel. They should take with them all kinds of Sicilian wheat and other grains, and sumach plants. I can always obtain in the proper season—say December and January—20,000 if required; cost, a trifle. If the lemon and orange trees of this place were introduced—say into Florida, they would stand the cold much better than those already introduced from Cuba, which are not of a hardy kind. I can obtain all that may be wanted for an introduction, and Sicilians to cultivate the trees. The exports of sumach to the United States last year were 65,000 bags. Lemons and oranges, 350,000 boxes from Sicily; more than three-fourths from this port. Such is the trade in these articles alone, besides large quantities of other productions. If I can serve you or my country in any way beneficially, it will give me great pleasure to do so.

I am, dear sir, your obedient servant,

JOHN M. MARSTON.

W. D. Porter, Esq.,
U. S. N., Washington.

The soil of Sicily generally is a limestone formation—a reddish soil, which I think corresponds with the land in Maryland, Virginia, North and South Carolina, and the States west of those named. In Sicily, sumach is cultivated in the valleys or level grounds, or on the sides of the mountains; it requires no rain for two months before harvesting it. The soil of Sicily is so fertile that I do not think they manure the ground at all for sumach.

We suppose that the reason of the superiority of Sicilian sumach over that of other countries lies in the mode of cultivating it. All the leaves are the productions of the *young sprouts* that spring up from the stump every year. Being so young, the leaves are full of life when cut, and have not decayed, like those of old trees. This, with a dry climate in the latter part of the season, and the soil suiting the plant, gives it the reputation it has all over Europe and America.

J M. M.

III.

CATTLE BREEDING.

ON THE PHILOSOPHY OF FATTENING CATTLE.

[From the London Plough.]

Next to understanding properly the chemical analysis of soils, the application of proper manures, and the crops which should be grown from the land by proper tillage, there are but few subjects more deserving the attention of the practical agriculturist than a knowledge of the proper connexion which exists and should be duly preserved between the members of the animal and vegetable kingdoms. As I observed in my lectures on the "Philosophy of Agriculture," so may I now repeat man is an omniverous animal—he is so destined by the Almighty, who has so created his masticatory and digestive organs that he can live and flourish under a compound diet of animal and vegetable food; we are also told by Divine authority that "man shall not live upon bread alone;" consequently, as it is necessary that he should have recourse to substances of a different nature to use in combination, so is it equally of paramount importance that he should direct his care, skill, knowledge, and attention to the management of cattle, so that they should be able to afford him the greatest possible amount of nutritious food, and at the least possible expense in money to himself, and waste or loss, or both, in the preparation of the same.

It is my intention in the present lecture to make a few observations on this subject, to show you the wisdom that experience has taught us, and which I have drawn from many sources—the results of the labors of practical men. To some I may have the pleasure of addressing, the theme I shall discuss may appear novel; while I doubt not that many who are here present will be able to confirm many of the truths which I shall utter.

The existing link between animals and vegetables forms one of the most beautiful chains in nature, and one which cannot be dissolved; it is one of the greatest value to the practical farmer, because it so materially affects his operations in breeding, rearing, and feeding his cattle.

In considering this subject philosophically, we must first of all examine what are the substances which enter into the office of nutrition, and ascertain by what means, as far as our limited knowledge extends, nourishment is afforded to the animal. The vegetables upon which not only cattle but ourselves are fed, consist of two portions, viz: an organic and an inorganic; and upon instituting a chemical analysis, we find that the inorganic is chiefly composed of a considerable quantity of water, much carbonic acid in combination with the salts of am-

monia, and nitric acid; the inorganic portion is entirely derived from the soil from which they grow, and the science of chemistry informs us that it consists almost entirely of saline constituents and earthy particles, which, upon incineration or burning, constitute the ashes of the plants. I refer you to what I stated in my lecture on the "Philosophy of Agriculture," as to the manner in which these particles are absorbed by the plants, and which you will find published in Nos. 1 and 2 of "The Plough," detailed at length; but I may here briefly remark, that these substances are taken into the texture of the vegetable by means of the leaves and roots, which, under the chemical action and influence of the light from the sun, are decomposed—the oxygen becoming returned to the atmosphere which originally gave it; while the elements of water, with the carbon, unite to form starch, sugar, gum, or woody fibre, and, with the elements of ammonia or nitric acid, constitute albumen, casein, or gluten. Thus the plant derives its food almost entirely from the inorganic kingdom; while the animal, on the contrary, from its anatomical conformation, can only exist upon organic matter.

During the present century such great discoveries have been made in the science of organic chemistry, particularly by the discoveries of the late Sir Humphrey Davy, Dr. Edward Turner, Professor Brande, Drs. Faraday and Gregory, and last, though not the least, those of Baron Justus Liebig, of Giessen—to whom may be added the labors of a rising young chemist, Dr. Lyon Playfair—that much valuable knowledge has been imparted to the philosophical and agricultural world upon the physiology of animal life, and the manner by which the system is nourished and supported.

We now, therefore, can well comprehend why one species of diet is found to possess a greater quantity of nourishment than another—why the inhabitant of the frozen regions of the north, as I have seen in the persons of the Esquimaux and Greenlanders, should require great quantities of train-oil with his daily food. And why? His stomach will digest the rancid flesh and blubber from their rancid whales and seals; while the same species would not only be disgusting to us, but actually prove both physically and mentally injurious to the inhabitants of more congenial and warmer climates. We also understand from the same source how it is that we cannot feed animals or exist ourselves upon a diet wholly composed of sugar, starch, gum, or gelatine; and, although we cannot live upon any one of these substances, yet, when they are all properly combined, strange as it may appear to some, it is of all these materials, when properly united, that our daily food is composed. The great office of chemistry, as applied to this department of human knowledge, is to point out the peculiar wants of animal bodies, and how these are duly supplied in the food we and they daily consume. Anatomy informs us that, like the vegetable, an animal body is composed of two portions: the organic particles form a considerable portion of the flesh or softer tissues of the body; and also an inorganic portion, which Professor Berzelius, of Stockholm, Guy Lussac, Vauquelin, Thenard, and Fourcroy, with Dr. Magendie, of Paris, and other experimental chemists, have demonstrated also to constitute a small portion of the softer parts; but it is in the bones, which constitute the skeleton, that they are principally found; and these are directly derived in the *herbivora* (or vegetable-feeding animals) from the vegetable diet upon which they subsist,

while the *carnivora* (or flesh-eating tribes) obtain it indirectly from the blood and flesh of the herbivorous animals upon which they prey.

These remarks naturally lead us to a proper consideration of those substances which form chiefly the food of those animals which are bred, reared, and supported by the farmer either for agricultural labor or as food for man, and in many cases for both. Strange to say, they are principally herbivorous in their nature. Examine chemically, therefore, any article which they consume—no matter whether it is wheat, beans, peas, cabbage, carrots, or turnips—we shall soon find that, besides water, it has gum, sugar, starch, and a considerable quantity of woody fibre, in union with a small portion of a fatty matter; all these constituents, as I observed in my former lectures, will be found to be composed only of three elements, viz: oxygen, carbon, and hydrogen, which exist combined in nearly the same proportions. But we likewise find that there are many other substances contained in vegetables which contain nitrogen; and this is in addition to those elements which compose starch, gum, &c., and are known to the chemist by the appellations of gluten, vegetable albumen, and casein. Now, if we take a small quantity of fine wheaten flour, mix it with water into a paste, and well wash it upon a sieve, by pouring a stream of cold water over it while it is kneaded with the hand, all the sugar, starch, and gum will pass away through the sieve with the water, and the substance left behind will resemble bird lime, being of an equally tenacious nature; this is, therefore, the gluten which the wheat contained, and when dried, the water which it possessed being evaporated, it resembles horn, being a hard, brittle mass; and if burnt, it emits a similar unpleasant effluvia to burnt horn, feathers, or other animal matter. The gluten which is obtained from peas, beans, or the fibrin and vegetable albumen procured from the expressed juices of the carrot, turnip, or cabbage, all possess analogous properties to those found in wheat, with this exception, that they are all soluble in cold water; whereas the gluten which is obtained from wheat is not. If we submit these substances to the test of chemical analysis, we speedily discover them to be all composed of the same constituents, and also that they are likewise identically the same as those composing the flesh and blood of animals generally; but you must please to bear in mind that this remarkable identity does not consist in their containing azote or nitrogen, in combination with oxygen, carbon, and hydrogen, in the same, or nearly the same, proportions as in animal flesh and blood; but it extends to the existence of a small quantity of sulphur and phosphorus, which is found to be associated with the muscular flesh, forming one of the soft tissues of the animal. Hence we may very properly assert, as a physiological axiom, that the flesh and blood are, by the great Author of Nature, found actually ready prepared and elaborated in the vegetable. The plant it is which elaborates and duly prepares all the elements of water, carbonic acid, and ammonia, which constituent particles are found to be identically the same as the muscular animal flesh; consequently the animal has nothing more to do than to apply them to his own use for the purposes of nutrition, secretion, and the vivification of life.

The following table, adopted by my talented friend, Professor Gyde, of Painswick, will give the reader an idea of the actual identity of composition existing between these substances:

TABLE I.

Elements.	Gluten from flour.	Casein from peas.	Ox blood.	Ox flesh.
Oxygen.....	22.4	23.0	22.2	22.3
Hydrogen.....	7.5	7.2	7.5	7.5
Carbon.....	54 2	54.1	54.3	54.1
Nitrogen.....	15.9	15.9	15.8	15.7

Every animal body momentarily undergoes some physiological change; every motion, thought, and action is of course performed at the expense of some, and many of almost every, part of the body. These incessant alterations and action cause the great demand for food which nature constantly requires to repair the waste that is continually taking place. You may speedily ascertain the truth of this fact by noticing its illustration in those animals which have long been kept without food, or had but a scanty supply, or where it did not possess sufficient nutritious properties; and also in those animals which have undergone great exertion and bodily fatigue, when contrasted with those but little fatigued, and whose food was good in quality and sufficient in quantity. The fine horses formerly attached to our well-appointed coaches, before the construction of railroads and the employment of giant steam power, and which vehicles will ere long only be remembered by being recorded in the pages of history, among the phenomena that have been and are passed away—the fine horses I have named were almost exclusively fed upon oats and beans, which are two of the most nutritious kinds of all species of vegetable food; while, on the other hand, those horses performing but a small amount of laborious work will supply the natural waste of their bodies from the very small comparative quantity of gluten which is to be contained in hay or clover, or both.

I have already informed you that the food of all classes of animals consists of two kinds of distinct species of matter, viz: the one which possesses a great proportion of azote or nitrogen as one of its principal constituents, and which the table I have referred to tells us is identified with the blood and muscular flesh of the animal. The other portion is destitute of nitrogen, but consists of gum, starch, sugar, and woody fibre. Now, every one of these different materials answers two quite distinct, but very important purposes in the economy of the animal body. The first, or the nitrogenous constituents, supply the waste which has occurred in the fluids and tissues of the body, and, as Dr. Magendie very properly states, may justly be termed the elements of nutrition. The last, which are the non-nitrogenous portion, act, if I may apply the expression, as fuel for combustion in the lungs, in order to keep up the due supply of animal heat, and, under some peculiar circumstances, also, will contribute to the formation of fat. These elements may likewise be arranged under two great heads, viz: those which are necessary to the function of nutrition, and those affecting that of respiration.

I respectfully call your attention to the following table, wherein they are exemplified:

TABLE II.

1. *Elements of nutrition.*	2. *Elements of respiration.*
Gluten.	Gum.
Albumen.	Starch.
Casein.	Sugar.
Flesh, or muscular fibre.	Oil or fat.
Blood.	Alcohol.

The elements of nutrition (No. 1) must of necessity exist in combination with every substance which experience has taught us to be capable of supplying food to the animal; but, ere it can impart the nutriticus properties, numerous important mechanical and chemical changes must take place. The grand process of digestion must be performed, by which I mean the manner by which the nutrient particles may be rendered soluble, and not only capable of entering, but even of forming new blood. A brief detail of the manner in which this is performed may not be uninteresting to some of my present auditory. It is accomplished in the following manner: the food, when received into the mouth, is broken down by the teeth, where it becomes mixed with the saliva which is secreted by the glands that are situated near the angle of the jaw, and beneath the tongue; when the process of mastication is completed, the morsel is collected into a ball at the base of the tongue, and by the act of deglutition, or swallowing, it is carried past the pharynx into the œsophagus, or gullet, down which it passes into the stomach, where it enters at the cardiac orifice; it remains there for a short time, according to the nature both of the animal and the food it has partaken of (in man it is supposed to be about two hours). The chemical and mechanical action that now takes place is technically called, in physiological language, the process of *chymification;* when this is perfected, the orifice at the opposite extremity (denominated the pylorus) becomes dilated, and the chyme passes into the first of the small intestines, anatomically named the *duodenum*, where it becomes mixed with the bile from the liver and the fluid from the pancreas, or sweet bread. This being accomplished, the process of *chylification* now commences: a series of small, minute vessels, named lacteals, whose mouths open on the mucous (or villous) coat of the bowel, or intestine, absorb the nutritious portion of the food (which resembles milk in appearance; hence it is named *chyle*). This fluid, being conducted by numerous branches, passes into one great reservoir, called the thoracic duct, which ends in a large vein near the heart, (the left subclavian,) and there it is mixed with the blood; but being loaded with carbon, which is inimical to the due preservation of human life, the blood passes from the heart to the lungs, where it becomes oxygenized, and fit for all the purposes of the animal economy. The non-nutritious portion, from which the chyle has been extracted, passes through the last of the small intestines (the *jejunum*) into the whole course of the larger part of the alimentary canal, viz: the *cœcum*, *colon*, and *rectum;* and from the last they are finally ejected from the body, ultimately again to re-enter it in another form, in consequence

of its forming manure, and therefore affording food for plants, in the manner detailed in my former lectures.

But independent of the simple fact, that the salivary fluid, when commixed with the food, renders the digestion of the aliment far more easy, yet Baron Liebig imagines that it possesses the peculiar offices of enclosing and combining air in the form of froth; the oxygen which it contains enters into union with the constituents of the food, while the nitrogen is again evolved through the medium of the lungs and skin. This philosopher is likewise of opinion that, in many of the herbivorous quadrupeds, their rumination (as the oxen and sheep, for example) has for one of its principal objects a complete renewal with the repeated introduction of pure oxygen into the animal's stomach; and that, unless this takes place, the function of rumination cannot be duly perfected in the stomach. I have given you a brief outline of the manner in which digestion is accomplished; but in doing so I omitted to observe that, attached to the mucous or villous coat of the stomach, are a series of minute glands, which secrete what is denominated the gastric juice, or fluid, and which, among other matters, contains a quantity of pure mucus, in combination with a small quantity of free hydrochloric or muriatic acid, (called, in common language, spirits of salts,) with a peculiar principle known to chemists under the appellation of pepsin, and which has been confirmed by Dr. Sylvester, of Clapham, to be, in itself, a most active and virulent poison, but whose noxious properties are chemically neutralized in the stomach and intestines during the function of digestion.

I have stated that hydrochloric acid is always present in the stomach, and particularly so during the digestive process. For the discovery of this curious but important chemical fact, we are indebted equally to M. Tiedman Gmelin, of Germany, and Dr. Prout, of London. This acid may be artificially obtained by the decomposition of chloride of sodium, or common table salt (which is only a combination of pure muriatic acid and soda). The acid is of great service in promoting the function of digestion in the stomach, while the soda, as an alkali, copiously enters into the formation of bile. Thus it is that a certain proportion of salt is necessary to digestion in every species of animals—at least as far as our knowledge extends in the classes of quadrupeds and birds; and although chemistry tells us that it is an essential ingredient in the burnt ashes of the vegetables, yet we very rarely find it existing in a sufficient quantity to form a regular supply of either in the acid or soda which is required for the due performance of the function of healthy digestion; and, therefore, not only should we ourselves partake of a certain quantity daily with our own food, but should place some within the reach of both birds and cattle under our management in the farms we are connected with. Nature is the philosopher's best monitor, and the scientific farmer cannot do better than to obey her axioms. We find that all classes of animals have, if I may use the expression, an instinctive love for salt, and seek for it as for a portion of their diurnal food. It is well known that the pigeon tribe of birds, if they cannot obtain it elsewhere, will even have recourse to the mortar which cements the bricks of houses together. They have been frequently known to fly to the sea-coast in order to procure it; and pigeon-fanciers who are not so honest as to mind borrowing their neighbors' birds will allure them by means of

what is known as a salt-cake, placed in or near the dove-cote, wherein muriate of soda forms an essential ingredient. This nefarious practice is now forbidden, very properly, by an act of Parliament, which awards a punishment of seven years' transportation upon conviction. It, however, confirms the important physiological fact I have just noticed.

In the ruminating tribe of the class *mammalia*, as the ox and the sheep, the important process of digestion differs but little from that which I have stated, and their stomachs are of the simplest construction, being little else than a mere membraneous bag; but in the *ruminantia* we find their stomachs considerably more complicated, in order that they may be enabled to extract the due proportion of nourishment which they require from the food which they eat; as in the case of grass, by way of example, which we find by chemical investigation contains but very little nourishment in proportion to the bulk. Let us now philosophize for a moment, and see the manner in which the ox and those of his class perform the functions of mastication and digestion. In these creatures the grass is cropped from the surface of the earth by means of the fore teeth, and, after being but very slightly masticated, is swallowed. This process continues until the first stomach is filled,* when the animal lies down apparently well and perfectly contented; but it is now that the curious process of rumination commences. In the first stomach the food is mixed with a secreted fluid not dissimilar to the saliva, and in a kind of semi-pulpy mass it is returned into the mouth, in small detached portions, where perfect mastication takes place, and during this process the animal is in a recumbent position; after the second and perfect mastication is completed, the food passes into the second stomach, denominated by comparative anatomists *omasum;* from this it passes into the third stomach, the *abomasum;* in these last two it undergoes very important changes, and whence it passes into the fourth or really true stomach. It is in this last portion of the curious but complicated species of apparatus that the function of digestion is ultimately and perfectly performed; and the last processes of extracting the nutriment from the food are exactly similar to that which I have described as occurring in man and those animals having simple membraneous stomachs. The vital fluid of all animals is commonly denominated the blood, in which, as Holy Writ truly observes, "*is life;*" this fluid is either formed from vegetables, as in the *herbivora*, or from flesh, as in the *carnivora;* yet in both tribes of animals the composition and essential constituents are the same, both in their physical effects upon the system and as portrayed by chemical analysis. We find it circulating throughout not only the principal organs in the living animal, but by means of vessels as fine as the human hair; so extremely delicate are they that they will not admit the thicker coloring particles of the blood itself; yet the properties which the blood possesses are most surprising; it replenishes the fluids and solids which are diminished by the waste, wear, and tear of the body; it places osseous or bony matter in the skeleton for its growth and support; forms fleshy fibres for soft muscular tissue, by which the motions of the body are performed; and from the blood are all the different bodily secretions which are necessary for the healthy existence of the animal secreted and performed; the

* We should here observe that the lecturer exhibited drawings of the stomach, as found in both tribes of animals.—*Ed. Plough.*

blood supplies carbon to the lungs for keeping up the animal heat, with fat and oily fluids deposited in the softer tissues, as well as in the very substances of the bones themselves, as a store from which nature can extract a due supply when necessity compels her; lastly, the blood is the true moving power by which the whole animal machine is put into motion, just as steam is to the steam engine, and coals as fuel to the fire.

As far as I have proceeded I have only spoken of that part of the food from which animal flesh is naturally formed; *i. e.*, the gluten extracted from the vegetable, the albumen, and the casein. My self imposed task, however, is not yet complete. I have now to take into consideration the offices which are fulfilled by the sugar, starch, gum, oil, or fat, which we find, by examination, constitute so large a proportion of the food of man and the principal of the lower orders of animals. Now, we find from observation that every animal has a temperature above that of the surrounding atmosphere; and physiologists have denominated it the animal heat, which, in those animals domesticated by man, is found to be, on an average, about 100 deg. of Fahrenheit's thermometer; in man it is about 70 deg., and we find that it continues much the same under every kind of circumstance, whether we live beneath a tropical sun, a more temperate region, or the frozen climes of the North.

The animal heart originates in the body; it is created by the chemical combination, or, if I may employ the term, the combustion of the elements which enter into the formation of starch, with the other non-nitrogenous constituent particles of the food, united with the oxygen of the air, which is received into the lungs during the function of inspiration; and likewise by a portion that is absorbed through the skin.

Upon examining the atmospheric air which we breathe, we find, upon submitting it to a chemical analysis, that it is composed of twenty-one parts of nitrogen, with so small a quantity of carbonic acid gas that its amount cannot be calculated in a given quantity of air; yet of course an immense proportion must exist, for it is supposed that the atmosphere extends forty-five miles at least in height, and presses at the ratio of fifteen pounds upon every square inch. This was discovered by Torricelli and Galileo in the seventeenth century. However, when the air we have inspired has been expelled from the body, we find that it has undergone but little if any change; the oxygen, however, has disappeared, and been replaced by an equable quantity of carbonic acid gas, with a small quantity of aqueous vapor. The proportion of animal heat which attends this chemical change is consequent upon the amount of carbon and hydrogen which is consumed. The heat which is thus produced is occasioned by exactly the same chemical action as that which causes the combustion of wood in a stove, or the fat of a lamp or candle, and the products of which are exactly the same; the carbon and the hydrogen of the food combine with the oxygen that is supplied by the atmosphere, and heat is generated in the body in proportion to the quantity which is consumed. In the stove or lamp the same changes take place, the fuel being composed of similar elements entering into the composition of the food; and the results of the combustion are precisely the same, the combination being less energetic in the body than in the stove or lamp.

Now, how is it in man? In a full-grown adult, if we take the weight of the carbon which is disengaged in the excretions from the weight of the carbon contained in the food that is consumed during the twenty-

four hours, we shall soon find that the remainder will amount to somewhere about fourteen ounces, and this is assimilated with the component parts of the body; the weight of which, however, does not increase, for it is a well-known philosophical axiom, that fourteen ounces of carbon will require thirty-seven ounces of oxygen* for its transformation into carbonic acid, which passes off from the lungs and skin. Thus, in this simple manner, we can easily comprehend how it is that the enormous quantity of oxygen which is introduced into the animal body by the progress of inspiration, and the great proportion of carbon which is derived from the food consumed, are removed from the body; and, likewise, how it is that the food required for supporting the animal in its normal condition is in exact proportion to the quantity of oxygen that is absorbed. Now we find that a horse consumes daily, in his food, upon an average, eighty-nine ounces of pure carbon, and a cow seventy ounces; the former requires 212½ ounces, the latter 186½ ounces of oxygen, in order to transform the consumed carbon into carbonic acid. I have already stated that, in addition to the constituents which I have named, the vegetable is found, upon chemical analysis, to contain a small quantity of fatty matter in addition to the earthy and saline substances of which it is composed. The question is now to be answered, What are the purposes which they answer in the animal economy? Every animal that is in a state of sound health has a layer of fat, which is situated between the skin and the muscles, and likewise between the muscles themselves, by which means they have great freedom of motion. Fat is also deposited in the body of the animal, particularly in the neighborhood of the bowels, also attached to a portion of them, and enveloping the kidneys, (where it is vulgarly called by butchers the suet). In the *carnivora*, or flesh-eating animals, the fat which is contained in the food they eat is consumed in the lungs for the purpose of preserving the proper quantity of animal heat, and consequently in these creatures we but very rarely find the body of the carnivorous animal to contain much fat. M. Darwin, in his Journal of Researches into the natural history of the countries visited during the voyage of the Beagle, informs us that the Gauchos, or simple countrymen in the Pampas, South America, lived for months together upon flesh; but he observed that they ate large quantities of fat. And Dr. Richardson, in speaking of these people, has also remarked "that, when they have fed for a long time solely upon lean animal food, the desire for fat becomes so insatiable that they can consume a large quantity of unmixed and even oily fat without nausea." This instinctive desire for fat in man and animals living on flesh arises from the imperative demands which are daily made upon the body for carbon to keep up the proper amount of animal heat, and which is contained in the fat that is consumed as an article of diet.

Thus far in the omnivorous and carnivorous animals; but in the herbivorous creatures it is widely different. The supply to the lungs is derived from the starch, sugar, and gum in the vegetable, while the fat which exists in the food is in a great measure laid up as fat in the animal body; therefore it is that we find the bodies of herbivorous quadrupeds generally much fatter than the *carnivora*. But if the supply of the starch in the food is inadequate to the demands of respiration, then the elements

* One ounce of oxygen equals 1,416.5 cubic inches.

of the fat become consumed in the lungs, exactly as it is in the carnivorous animal; the sugar, gum, and starch become speedily transformed into aqueous vapor and carbonic acid in the animal system. These are the first consumed; and if this supply proves to be inadequate for the purpose required, then the fat, next the fat of the animal body, and, finally, the tissues themselves, are placed under contribution; the animal becoming thin, feeble, and emaciated, and ultimately dying from starvation.

REDUCING THE FOOD OF CATTLE BEFORE GIVING IT.

As I have just concluded the experiments you wished, I hasten to forward you the results, which are as follow: Two horses in good health, in daily work, and as nearly as possible equal in size and age, were selected for the experiment. They were each allowed 5 lbs. of oats, 42 lbs. per bushel, and a sufficiency of good hay, of which they consumed about 17 lbs. per diem each horse. The only difference in the feeding consisted in one horse having the oats thoroughly crushed, and the other being allowed the oats uncrushed. On the fourth day of the above mode of feeding the solid excrements of each horse were examined; 100 parts of the dung from the horse fed on crushed oats were found to be deprived of all the nutricious matter contained in the food, and to consist of woody fibre, mixed with the animal secretions and some salts; while 100 parts of the dung from the horse fed on uncrushed oats were found to contain one-quarter per cent. of nutritive matter, consisting of starch and gluten, which had not been acted on by the stomach, mixed with the ordinary constituents of the solid excrements of the animal—this arising from the inability of the horse to perform perfect mastication, and must vary with circumstances, such as age and rapidity of feeding. The same horses were then fed with cut and uncut food, consisting of hay cut into chaff and hay uncut. At the expiration of the third day the excrements were examined, but no chemical difference in their composition was detected; the food, in both instances, was found to be equally exhausted of its nutritive matter. The shorter period occupied by the horse in filling its stomach, and consequently greater amount of rest obtained, and the means of mixing food and preventing waste by cutting it into chaff, require no observation from me, but will be material points in this mode of feeding.

A. GYDE.

SHEEP.

I received, a short time since, a copy of the printed Agricultural Circular issued from the Patent Office. Several points in the inquiries have attracted my attention, but I can only devote a leisure hour to a response to that relating to "sheep." The subject is so full of interest and so important, that a volume would be necessary to approach an adequate examination of the various topics it involves. I will attempt to compress in a small space some prominent considerations which are founded upon the experience and reflection of years. I think sheep husbandry in many sections of the country eminently profitable. The extent of this depends

of course upon the scale in the prices of wool. A medium price now prevails, and in those districts appropriated to the purpose, few occupations to the farmer can be more attractive or remunerative. It should always be recollected, in forming an opinion on this subject, that lands of little value, and worthless for most agricultural purposes, are those best adapted to a summer range for sheep. Luxuriant pasturage is afforded to them by the scanty herbage that springs up in the fissures of the rocks and the gorges of mountain nooks, and by the briers and bushes which mantle their cliffs. Sheep range and fatten upon precipitous crags inaccessible to cattle and horses. Sandy plains are in the highest degree congenial to the health and habits of sheep. They are often relieved from epidemic and hereditary diseases, contracted in cold and moist pastures, when transferred to a range upon light, dry lands. They feed with great avidity upon the sprouts and bushes, the spontaneous products of sandy soils. This vegetation, and the rank and coarse herbage which infest these lands in their native condition, are extirpated by the sheep, and white clover rapidly introduced. This clover always indicates the presence of sheep, and is, perhaps, the most delicate and nutritious grass for pasturage. It springs early, and affords an early and enduring feed. It is of immense importance in the renovation and fertilizing of these lands. Its fibres spread gradually a massive net-work over the entire surface, that binds the soil together, protects it from the sun and winds, and affords, in tillage, a rich basis for agricultural operations. Neat cattle or horses would starve upon a tract of sandy soil where sheep will thrive and fatten, whilst they maintain the land in constant progression in value and fertility. The continual and gentle pressure of their feet consolidates, without penetrating, the earth. The light and diffused droppings of sheep fertilize the soil, when the copious excrements of larger animals destroy vegetation and rapidly deteriorate pastures by the introduction of coarse and worthless herbage. In my personal experience I have known pasture ranges occupied for dairies become, from this cause operating a few years, totally infested by bushes, johnswert, and other noxious weeds, and of little practical value. The introduction of sheep in two seasons has thoroughly subdued this rank vegetation and dotted the earth with a rich and delicate growth of nutritious clover. When the great value of sandy lands in sheep husbandry becomes understood, vast tracts of barren and desolate wastes, which are now unoccupied and deform our country, will be appropriated for sheep ranges, and with the most profitable results. The immense and beneficial influence of this system—not alone on the wool-growing interest, but upon the wealth and producing capital of the nation—can scarcely be appreciated. Each class of these lands, specially adapted to sheep, may now be purchased at almost a nominal price. Sheep will nearly maintain themselves during the winter whilst they have access to the earth, or good opportunity of browsing, and uniformly long after other stock have demanded vigilant care and incurred heavy expense. They have been known to subsist in vigor and health an entire winter with no food or protection other than the boughs and limbs of the pine. They eat greedily, and are sufficiently nourished by the poorest hay mingled with ferns and bushes. A great proportion of the winter fodder of hardy sheep may consist of bean and pea straw, with other refuse of the barn. No animal known to the economy of our agriculture can be maintained with so much ease

and so little expense. These remarks apply to this branch of husbandry when there is occupation of the lands I have underrated, which are peculiarly adapted to sheep. Low and damp loam or clay are not congenial to their health. Lands of great value, from their locality or productiveness in tillage, can more profitably be appropriated to other purposes. Another prominent fact must be regarded in an estimate of the advantages of sheep husbandry.

Horses, as they become aged, grow worthless. The ox and swine can only be prepared for the shambles with great toil and expenditure; but the sheep, when turned off at his maturity, is ready for market, with no other expense or charge than his ordinary pasturage. The summer-grazing of sheep upon appropriate lands is a trifling consideration in calculating their disbursements. One ton of hay, under ordinary circumstances, will keep ten sheep through a winter in the meridian of New England. The average value of hay in that district is $8 per ton. The incidental expenses of the ten sheep, particularly if no credit is given to their manure or fertilizing effect upon pastures, cannot exceed $2 in addition. With proper management, and the usage, which should uniformily prevail, of turning off sheep in a vigorous maturity, that estimate will cover the usual contingent loss from disease and accident. An average yield per head of full-blooded merinos should reach 3¼ cents of wool. The price of the current year is probably a fair medium, and presents for that grade of wool a minimum of about 40 cents. The ten sheep will average three lambs, worth at least three dollars when weaned. The account may, I think, be stated thus:

Dr.	Ten sheep, to one year's keeping - - -		$10 00
Cr.	By do. 32½ lbs. wool, at 40 cents - - -		13 00
	By do. 3 lambs, at $1 each - - - -		3 00

Leaving an excess of $6, the annual profit of ten sheep. I think facts and observations will sustain this calculation. I can more readily illustrate my views by a brief statement of the management and profits of a single flock, with which I am familiar. This flock consists during the winter of about 350 sheep of all classes. The manager selects annually about 100 choice young ewes, not under two years old, for breeding. He usually raises as many lambs as he appropriates ewes to breeding, twins often more than equalizing any occasional losses. He turns off each autumn fat sheep, equal in number to the lambs which he raises. The sheep are at the period of their full vigor and highest value, and command from $1 25 to $1 75. The flock averages 3¼ cents of wool, which at the present season sold for 44¼ cents per lb. The casual loss in this flock is so insignificant as scarcely to enter into the estimates of the manager. I am aware that this case exhibits remarkable results, but none that cannot be attained by an exercise of the same judgment and skill. The only peculiar features of this management are those which I have already referred to in the habit of disposing of the refuse of the flock before they become deteriorated by age or disease, and their careful protection from the changes and severity of the climate. The sheep, particularly the feebler portion of the flock, are studiously housed throughout the winter. They are supplied with running water by pipes within the building, which they only leave an hour or two each day for air and exercise. They consume much less fodder by this ar-

rangement, and are protected from the alternations of wet and cold, generally so fatal to the health and lives of these animals.

In determining the relative value and profit of fine and coarse, or large and small sheep, regard must necessarily be had to the fact, whether the primary object of the cultivator is wool-growing or mutton. A few general suggestions will convey my views on this subject, and incidentally embody replies to several other points embraced in the inquiries. An opinion, formed many years since—that pure merinos were better adapted to the severe and fluctuating climate of our northern latitudes, and in general more profitable, than Saxon sheep—has been corroborated and confirmed by all subsequent observation. The former are more hardy in constitution, larger, and more vigorous. They excel in beauty, yield better mutton, and heavier fleece, which, in fineness and texture, often closely approximates to the latter. There has occurred so constant an intermixture of the breeds, that it is exceedingly rare to find a flock of pure and exclusive merino extraction. Many breeders have designed, and with occasional success, to preserve this purity. I am able to indicate numerous flocks of highly pure merino blood, and all are pre-eminently remunerative. These flocks are uniformly distinguished for compact fleeces, with long fibres of wool, white, and pure from gum. Their clip will average, in different flocks, from four to six cents per head. I cannot believe that such flocks can be essentially improved by an infusion of a foreign stock, whose great peculiarity seems to be a gummy, matted fleece. These imported animals may be favorably combined with flocks of short, loose, and open wool. Immense progress has been attained by judicious breeding in the last few years in the quality and value of our wool, and equally in the size and beauty of our animals. These improvements may be extended to almost an indefinite degree of perfection by the exercise of judicious skill and intelligence. Small and fine woolled sheep yield more wool in proportion—and of more value—to their size than the large and coarse sheep. They consume less food, but require more care and expense in their attendance and keeping. The mutton of the large, coarse sheep is much preferred, and bears a higher price in market; and as they should range on cheap pasturage in fattening, the difference in the expense from their increased consumption is an unimportant consideration. The conclusions I adopt from these views are, that merinos are the most appropriate breed in the northern section of the Union, where designed for wool-growing, and that large and coarse sheep are the most profitable where the primary object of the breeder is mutton.

The original coarse-woolled sheep, which prevailed in the country previous to the importation of merinos, have become extinct; but several varieties of long and middle-woolled sheep, and infinitely superior animals, have been, since that period, introduced. These sheep have all been propagated in Europe on account of the high and peculiar excellence of the mutton they afford. They are all, for this purpose, most valuable and desirable acquisitions. Among these varieties I assign the preference to the "South Downs." I think they unite the greatest combination of excellent qualities. They are beautiful in form and appearance, vigorous in constitution, sufficiently large, apt to fatten, affording mutton of rare and exquisite flavor, and yielding a heavy and compact fleece of wool, equal in fineness and value to half-blood merino. They

are peculiarly docile and domestic in their habits. The grades of this breed are most valuable animals. The cross of a South Down ewe with a merino buck unites as many desirable qualities as can be reached for the combined object of wool and mutton. They unite size and beauty with a heavy fleece and a fair quality of wool. The South Down and their grades may be raised with great success in every section of the country accessible to markets and adapted to sheep husbandry.

ON SHEEP BREEDING.

BY P. A. BROWNE, LL. D.

There are, doubtless, some persons who imagine that they have no interest in the breeding of sheep and raising of wool; if there are any such among our readers, we have a few preliminary remarks to make to them. Every one who eats *mutton* or wears *cloth* coats and pantaloons, or *flannel* or *worsted* under-clothing, or who in winter sleeps under a *blanket*, is *directly* interested in our subject. *Hunger* and *nakedness*, to a considerable degree, would be the results of *totally* neglecting to grow wool; and these, it must be acknowledged, are *formidable opponents* in any community. But we are all willing to admit that we take an *indirect* interest in what concerns any great class of the society to which we belong; and in the breeding of sheep and raising of wool, the *agriculturist* has a deep and abiding interest. The farmers and planters form a large proportion of the voters, the tax-payers, the producers and consumers of all agricultural, and the consumers of all manufactured products. It is calculated that there are in the United States four millions of agriculturists; and how can anything which intimately concerns so large a portion of our relatives, friends, acquaintances, and fellow citizens be unimportant to one of us? Agriculture is the elder sister of commerce and manufactures; which naturally lean upon her for support and maintenance; hence, every commercial and manufacturing community is bound to support the farmer and planter, as they are bound reciprocally to aid and assist the merchant and the mechanic. How many thousands are engaged in the transportation, stapling, and manufacture of wool, and in the transportation and sale of woollen fabrics? And their interests ought not to be neglected. We have not implicit faith in newspaper published statistics. In one which recently appeared, it is stated that the pounds of wool *used* in the United States are 70,762,829, and that the value of the raw material is $25,755,988; which would be allowing a fraction more than thirty-six cents for the value of each pound of wool. Now, if from the 70,762,829 pounds *used* in the United States, we deduct 18,000,000 of the imported, annually, it will leave 52,762,829 for the quantity *raised* in the United States; which, allowing an average of three pounds per sheep, would give 17,594,276 sheep in the United States; whereas there are many persons, who are deemed competent judges, who estimate them as high as thirty five or forty millions.

But whether the amount of wool used in the United States be over or under-rated, it has to be transported, stapled, and manufactured, and the fabrics transported and sold; and if you will add to the sum of agricul-

turists and farmers the number of these transporters, staplers, manufacturers of wool, and transporters and venders of woollen fabrics, the amount of persons interested in one subject will be greatly increased. Again, the United States *manufacture* wool; but, under the present imperfect system of sheep-breeding and wool-growing, we do not raise wool enough for the manufacturers, but, on the contrary, import annually about eighteen millions of pounds. Instead of doing this, we ought, after supplying our own manufactories, to export more than double that amount, raised by our own people, upon our own lands. And this we *can* do, and *will*, if those the most interested in this branch of industry, and their representatives, will only do their duty. American sheep-breeders and wool-producers possess eminent advantages over any other people engaged in the same business, for they have the best lands for the purpose at a very low price; a sheep may be maintained in some of our western and southwestern States at an annual expense of twenty-five cents, and will yield from two to four pounds of wool, worth, if of the proper kind, from forty to fifty cents a pound, not to mention the profit from the increase of lambs. The sheep-breeders of some other countries have yet to experiment upon the *kind* of sheep best calculated for their climate and soil; *here* that experiment has been made, but the result has not been fairly put before the public. In some places they can raise only *one species* of sheep; *here* we can produce *two*, being all that is necessary for the growing of fleeces. We have more than one thousand millions of acres of land capable of producing sheep, and there could not be a more useful measure devised than to encourage the hundreds and thousands of *emigrants* who are daily seeking an asylum upon our shores to settle on some of them, and turn their attention to this important branch of industry.*

It is thought by many agriculturists that by unskilful farming the fertility of our soil is gradually diminishing; and there appears to be great good sense in this opinion. If by suddenly taking everything away and returning nothing to the soil again, we would deprive it of those ingredients in the propagation of grain that are absolutely necessary for its growth, the argument will hold good where this is done *gradually*, except that a longer time is consumed in the destruction: the one is a *paralysis*, the other a *consumption*. But by the raising of sheep we return to the soil a portion of the precious ingredients of organization; for it is a well-known and acknowledged fact that sheep improve the land upon which they are pastured and fed. The raising and breeding of sheep has, in point of practical profit, another advantage over the raising of grain; it costs three times more to produce a bushel of corn upon *poor* land than it does upon *rich;* but this is not the case with sheep, for they can be maintained upon the *poor* land quite as well as upon a *rich* soil. Some of the finest wool in our collection was produced upon worn-out tobacco land of Virginia! Everything must be taken in connexion with the modern improvements of our country, or our calculations will be behind the age and useless. This is the age of *railroads!* The construction of these improved means of conveyance encourages

* We are said to possess a territory of 3,221,595 square miles—a territory 95 times as great as the Island of Great Britain, more than 16 times as large as France, more than 12 times as large as all Germany; yet from these countries we import millions of pounds of wool each year!

the transportation to a distance from the place of growth of agricultural productions, owing to which the refuse is forever lost to the soil upon which they grow; and this being repeated from year to year, the fertility is constantly reduced, until at length the farm can no longer produce a crop. Now, we can, for the time being, no more directly arrest the progress of this draining system than we can, with our hands only, stop the locomotive in its onward career; but by introducing upon each farm a flock of sheep, whose wool *only* is carried to a distance, we can in a great measure retard, if not entirely prevent, this deleterious consummation. So that we find that sheep with railroads may succeed; while grain with railroads will be a failure in agricultural economy.

Believing the above to be fundamental truths, and desirous as much as in an humble individual lies to promote the good of our common country, we have collected from nearly all parts of the world where sheep are raised, specimens of their fleece. These we have subjected to the most rigid scientific examinations with the microscope, michrometer, and trichrometer, with the double view of ascertaining *what has been done* abroad and what *can be done in the United States* as regards the production of valuable fleece. The result of these investigations, although highly creditable to a number of intelligent and careful sheep-breeders in various parts of the Union, discloses the lamentable fact that a majority of agriculturists, for want of proper information, are pursuing a plan of propagation that can never furnish to them and to their country a permanent, self supplying race of sheep, possessing, equally, the properties of both their progenitors. It is confidently believed that Congress can do much to render the system of sheep-breeding more perfect, and the subject calls aloud for their attention; for if history is to be depended upon, no country has ever existed, where due regard was paid to the propagation of fleece, that has not become wealthy. In the mean time we will offer a few observations upon this important subject.

Of breeding and raising domestic animals.—Breeding and raising domestic animals includes not only the multiplication of individuals, but the preservation and improvement of their species, so as to insure some desirable end, which should always be kept fully in view.

The design in raising *sheep* should be to produce, with the least trouble and expense, the greatest quantity of the most valuable quality of fleece; and when this is done, and then only, is the system of sheep-breeding perfect.

We are aware that there are some who consider that the main object in raising sheep is to produce fine flesh for food; and that others entertain the opinion that wool and carcass are of *equal* importance, and equally deserving of care and attention. But we maintain that the matter which ought to absorb our undivided attention is the fleece, and that the production of good mutton will be a necessary consequence.

The most valuable properties of fleece, as regards its usefulness in manufactures and the arts, are its fineness, its ductility, and its flexibility and elasticity—indicating its softness, its strength, and either its capacity to felt and full in an eminent degree, or its being free from shrinking.

Therefore the greatest perfection in sheep-breeding and raising consists in being able to produce an animal whose wool is fine, soft, and strong, and will felt and full perfectly; or one whose fleece is fine, soft, and

strong, and will not shrink. And we propose to show that *either* of these objects can be effected in the United States with *one stock*, and that *both* may be effected with *two* stocks, but that both cannot be done effectually and permanently with *one*.

Upon examining the above-mentioned properties of fleece, it is apparent that, inasmuch as these qualities depend upon specific differences of the animals, the same species cannot, by any management or skill of the breeder, be made to produce wool that will felt and full, and fleece that will not shrink; but that to vary the peculiar specific properties of either within the range of the specific characteristics of each species is more or less under the control of the skilful breeder.

For instance: the *diameter* of wool taken from animals descended from the same parentage may vary; so the ductility and elasticity of filament (and consequently the softness of the fleece) may differ, although the race is identical, and the strength of the fibres is doubtless subject to the same law; but far different is the case with the property of felting, fulling, and shrinking, which depends upon the shape, direction, and inclination of the filament, and these upon its organization, all which in the fleece that will felt, full, and shrink, are different from those that will not—so much so that we have ventured to call the one *wool*, the other *hair;* and so they are in the proper understanding of those terms; for—

1st. Hair is in shape cylindrical or oval; but wool is eccentrically elliptical or flattened.

2d. The direction of hair is either straight, flowing, or curled; but wool is crisped and frizzled, and sometimes spirally curled.

3d. Hair issues out of the epidermis at an acute angle; but wool emerges at a right angle.

4th. The coloring matter of a *perfect hair* is contained in a central canal; but the most perfect wool has no such canal, the coloring matter being disseminated in the cortex, or the cortex and fibres.

5th. The scales of the cortex of hair are less numerous than those of wool; are less pointed, and smoother; and they embrace the shaft more intimately than those of wool; causing wool to felt and full, while hair will not shrink. These things surprise on account of their novelty; but when they are perfectly understood, no one will any longer marvel why we say that "there are two species of sheep." Let us, then, in the first place, examine the subject of

Felts and Felting.

The word *felt* is from the Saxon "felt"—from "fel," the hide or skin of an animal. The fabric is manufactured from wool of sheep or other animals, the filaments of which are entangled and matted together, so as, without spinning or weaving, to form a compact mass. There is no doubt but that felting was practised at a very early day. It is true that the first impulse of an uncivilized mind would be to cover the body with the skins of animals rudely stitched together.* "Unto Adam, also, and his wife did the Lord God make coats of skins, and clothed them."—

*The Hare Indians, occupying the valley of the river McKenzie, are clothed in rabbit skins togged together. (United States Exploring Expedition.)

Gen., ch. iii, *v.* 21.* But it could not have long escaped observation that the filaments of the woolly covering of some animals, while yet growing upon their bodies, had a tendency to entangle and mat; and this *natural felting* was doubtless imitated by our earliest forefathers, probably long before spinning and weaving were known.†

Travellers tell us of Tartars manufacturing tent covers and tent-carpets by spreading two or three layers of wool on the wet ground and treading them together, making a *felt;* but they have no idea of

The Felting Property.

Notwithstanding the great antiquity of felting, and the great perfection which it has attained as a mechanical and manufacturing art, it was not until very recently, comparatively, that the property in the filament of wool upon which it depends was known, or even suspected. Experience taught that hair would not felt, and that wool would; and from the same great teacher it was learned that among the last-mentioned integuments there were various degrees of this matting and mass-making power, it requiring more felting power to felt than to full; but to explain the cause, or describe the *modus operandi*, the learned and unlearned were equally at fault. The skilful operator has a mass of wool which with his magic bow he has formed into the desired shape; this fleece, "light as the thistle down that floats on the air," with no other agency than a damp linen cloth and the pressure of his hands,‡ he in a few moments transforms into a firm cloth or felt; but neither he nor the scientific looker-on could explain the phenomenon. At length a filament of wool was placed under the *microscope*, and the mystery was revealed.§

It is the *scales* of the cortex of pile that cause the filaments to felt. They are circularly disposed; upon hair they are less numerous, smoother, rounder at the point, and embrace the stalk more intimately; upon wool they are more numerous, rougher, sharper at the point, and at their anterior extremities stand a little out from the shaft.

The scales upon the different wools should be drawn, described, and classified, to understand perfectly the felting power.

The first attempt to count the number of these scales was made by Mr. Youatt. He found upon the filament of Anglo-Merino wool 2,400 to a linear inch.

Let us here pause for reflection. If one inch in length of this wool has 2,400 scales, and it is (as Mr. Youatt tells us) in diameter $\frac{1}{750}$ of an inch, there are upon the whole area of its contour 23,040 scales, ever ready to hook and fasten into as many to be found upon every similar inch of filament with which it comes in contact!‖ Mr. Youatt afterwards

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*And see Lucretius, Lib. xi, v. 1,911,

†Yet weaving seems to have been known in the time of Job; for he says, 'My days are swifter than the weaver's shuttle."—VIII, 6.

‡The nitrate of mercury is sometimes used to facilitate the felting.

§In an article published in the Plough, the Loom, and the Anvil, for 1850, we have given a history of the discovery of the cause of felting, and endeavored to do justice to the memories of those concerned in its discovery.

‖The following calculation was made for us by Ferdinand Hubbel, Esq. There are 2,400 points (which are the edges of scales) upon one inch in length in merino wool; assuming it to be of the same circumference, there are 2,400 in the contour, and multiplying 2,400 by itself will give 5,760,000 for the number of points on the one inch of cylinder. But the filament has a diameter of only 1-750 of an inch: 7.22.1-250 : : 0,004 = 4-1,000 = 1-250. Divide 5,760,000 by 250, and you will have 23,040 for the number of scales upon one inch in length of a filament of wool that has a diameter of 1-750 of an inch.

counted the scales of other wools, from the result of which we have made the following table:

No. 1.	Saxony	2,720
2.	Ld. Weston's merino picklock	2,560
3.	Ryeland Herefordshire	2,420
4.	Ld. Weston's (common)	2,400
	Australasian M'Arthurs	2,400
5.	South Down	2,080
	Odessa	2,080
	New South Wales	2,080
	South Down picklock	2,080
6.	Australasian	1,920
	Irish long-wool	1,920
7.	Leicester	1,860
8.	Norfolk	1,600
	Wallachian	1,600
9.	East Indian (Deccan)	1,280
	Lincoln	1,280

10. Van Dieman's Land, being slight and indistinct, were not counted.

We must next speak of

The Shape and Position of the Scales.

It will be observed that, besides the *number* of the scales, their shapes and their positions upon the shaft may materially influence the felting power; for if the scales, although numerous, are smooth, rounded at their anterior extremities, and they adhere to the shaft, they will be less likely to entangle and mat together than under opposite circumstances. Hence the necessity of examining them under a microscope of high power, and of depicting and describing them as proposed to be done.

Of Fulling.

Wool, while being manufactured into cloth, is not felted, but scrubbled,* carded, spun, wove, and *fulled;* the latter process consisting in causing the filaments of the fleece, after having undergone all the other operations above enumerated, to enlarge and mat together, thereby giving more compactness to the fabric. It must be obvious that the same *property* in wool that causes it to *felt* must also cause it to *full.* But there is another peculiarity in wool, which is auxiliary to both these processes, namely, its tendency to form *spiral curls,* which must now be explained.

Of Spiral Curls.

It is one of the consequences of the eccentrically eliptical shape of wool to form these curls. If a filament of merino or Saxony wool be separated from the rest, it will be found to be contracted into these curls.

*The scrubbler consists of a large number of wooden cylinders, placed horizontally on a frame almost touching each other, with small cylinders placed above them. The cylinders are covered with iron teeth; which, as they revolve in different directions, tear the wool into minute proportions. After having been transferred from cylinder to cylinder, the wool is finally thrown off in a flake. It is then carded.

If it is extended until it is straight, and then set at liberty, it will spontaneously return to its original spirally curled condition. Now it is easy to conceive that filaments in this spirally curled state are more likely to entangle and mat together than they would have been were they straight or even undulated. But, preliminary to spinning, the wool has (as above stated) to undergo the operations of scrubbling and carding, by which these curled filaments are broken into minute curves or sections of rings, and these interlock still more than the entire spiral curls, as will be obvious to the reader; for these curves and sections of rings, having been tossed about in every direction by the scrubbing machine and cards, will present to the points of each other's scales opposite points of their own, which will be much more likely to interlock than when, on the unbroken filament, their points were all in one direction. Let us endeavor to make this still more plain by the aid of diagrams.

Suppose A and B to be spirally curled filaments of wool, presented to each other root to point. The points of the scales, being in opposite directions, confer a tendency to interlock. Now suppose these two spirally curled filaments to be broken into curves and sections of rings by the scrubbling machine and cards, at the places indicated by the horizontal lines upon the figure A B; the tendency to entangle is, in the first place, increased in proportion to the *number* of these curves and sections of rings. But suppose, again, that these curves and sections of rings are presented to each other (as they will be after the wool is scrubbled and carded) in the opposite direction of the points of their scales, as represented in figure C D; the tendency to entangle and the mass to mat will be still further increased, in proportion to the number of curves or sections of rings that are thus oppositely presented.

From all which we learn that, although the *scales* are the principal cause of felting, yet they receive considerable aid from the spiral curls. Having discussed so much at length the properties of the wool that will felt and full, it now becomes us to say a few words respecting

The Fleece for manufacturing articles that will not shrink.

Fleece that will not shrink (or will not do so in an appreciable degree) is exceedingly valuable for the manufacture of flannel, worsted,* blankets, hose, &c. Now we are to understand that *shrinking*, which is defined to be "the contracting into a smaller space," is only another word for "fulling," since it depends for its operation upon *precisely the same* properties of the *fleece*.† If wool possessing the felting property be manufactured into cloth, all but the fulling, it will afterwards, when used and washed in hot water, shrink; and so will *flannel, if made from the same material.* On the other hand, cloth which is made from a fleece *which has no felting property* will not full, and the only way to obtain flannel *which will not shrink* is to use that material. This is correct in theory, and will hold equally good in practice, as any one will discover who will try the experiment; so that nothing further remains to be

*Worsted is a thread spun of fleece that has been combed, and which in the spinning is twisted harder than ordinarily. Formerly, it was chiefly used to be woven into stockings, caps, gloves, &c. The name is derived from that of the town in England where it was first manufactured. (See Slater's Memoir, App. p. 440, where will be found some excellent remarks upon the manufacture of worsted.)

† The degree may vary.

known but whether the sheep breeder can at *pleasure produce a fleece that will felt and full*, or *a fleece that will not shrink;* and this question we propose to discuss.

Of Sheep.

Wool grows upon a great many animals, but our chief supply is obtained from the *sheep*. Sheep belong to the tribe of hollow-horns, of the order Ruminantia, and are distinguished from the goat principally by the direction of the *horns*.

We will not consume time by enumerating the different kinds of sheep, nor by noticing the vain endeavors that have been made to refer all the domesticated varieties to some wild species. They were domesticated as early as the time of Abel, for he was a "keeper of sheep;" but there were no doubt wild ones ever since, and even are at the present day.

Of the two Species of Sheep.

It is very evident to us that there are two distinct species of sheep, viz:

1st. The *hairy* sheep, and

2d. The *woolly* sheep.

The hairy sheep, when perfect, has no wool; and the woolly sheep, when perfect, has not a hair on it. We have already described hair and wool, and shown how the latter is admirably calculated for the manufacture of felts and all cloths which are required to full; and the former to the manufacture of flannel, worsted blankets, and hose, and all articles that are required not to *shrink*.

The fleece of the *hairy* sheep has sometimes been called "long wool," and that of the woolly sheep "short wool;" but the truth is, that the former is not wool at all, and these "long" and "short" names should be discontinued, being calculated to mislead. In the manufacture of fabrics that are required *not* to shrink, the hair should be *combed* and spun, but never scrubbled nor carded. The object is to preserve the same direction of filaments that they had on the body of the animal, where the scales are not opposed to each other, and where they have no tendency to entangle, even should they become loose.

But it will be objected that there are sheep that have on them both hair and wool. We admit it, and shall now proceed to show that the existence of such *mongrels* is no argument whatever against our division into two pure species. But, as the discussion of this point involves nearly the whole art of sheep-breeding, it is time that we should reduce what we have to say to order.

Rule the first. The sheep-breeder should never cross the two species of sheep, viz: the hairy sheep and the woolly sheep.

This is the most important direction we have to give; it is the golden rule—the *primatus principatus*—a rule the more necessary to be dwelt upon, as its adverse has been countenanced by authority, and has been acted upon by those whose example has been deemed worthy of being followed. Its discussion divides into two questions, viz:

1st. Whether the *hairy* sheep and the *woolly* sheep belong to *two* distinct species. And

2d. Whether, by the amalgamation of two distinct species of animals, *a permanent self-supporting race, possessing equally the properties of both parents*, can be produced.

The learned have not always agreed upon a definition of the term "species;" on the contrary, it has been used in different senses, according to the mode or subject, whether literary, popularly, logically, or zoologically and physiologically. In its zoological and physiological meaning it is, according to the Rev. Thomas Smith, "*a fixed* PRINCIPLE, founded upon the indefinite varieties of which animal life is capable." In regard to *proof*, he considers *common parentage* as the best evidence which the nature of the case admits; but, as this parentage could not always be traced, he does not exclude other proof.

We acknowledge that we prefer the definitions of species given, respectively, by Van Amringe and Mills; but we do not think that it would be hazarding too much to affirm that, under almost any other definition of it to be found in the books, the modification of an animal, from being *entirely covered with hair* to being *entirely covered with wool*, when *permanently native in its race*, is sufficient ground for a specific distinction. That this is the case with the most perfect kind of animals known, we think we have proven in "The classification of *Mankind* by the hair and wool of their heads," to which we refer; and if we have, the argument, from analogy, in regard to the two species of *sheep*, is irresistible. But, even if it shall not be considered that we have heretofore shown by the hair and wool that man is not confined to one species, we shall contend, and shall endeavor to prove, that there are *two species of sheep*.

"Species (says Van Amringe) is a constitutional organization in a race of animals producing a similarity of functions, in which they agree with all animals of the same genus in generic character, but differ from races of the same genus in modifications of generic character—in regard to form, color, instincts, or intellectual power—and which we have good reason to believe to be permanently native in the race."

Now, in considering the permanent modifications of generic character as regards form, let us see whether naturalists generally have not been influenced by discrepancies of a much less decided character than those which distinguish the hairy sheep from the woolly sheep. The general similitude between the horse and the ass is very striking—the difference between them (if we throw out of view a discrepancy in the dimensions of the head and ears) consisting in the *color* and *marking* of the *pile;* yet where is the naturalist who has put them in the same species? The zebra, which has pretty much the same form as the horse and the ass, is placed in another species on account of the singular disposition of the colors of his hair ("*Equus lineis transversis versicolor,*" Lin.).

The quagga, the onagga, the dziggatai, between which and the horse and the ass there exist still slighter shades of difference, are all considered as distinct species. The two species of camel are distinguished by one having *one* and the other having *two* humps on the back, and they are never placed together.

There are two species of rhinoceros, one having *one* and the other having *two horns.*

There are several species of the deer kind, which are known mainly by the difference in the horns. Some species of monkey are distinguished by the presence and others by the absence of the *tail.* Sloths are separated into species by the number of their *toes.*

And in Peru there are two species of lizard, the only difference between which is, that the one has an orifice in the thighs, for the passage of a gland, which the other has not.

Why, then, hesitate to acknowledge *two* species of sheep; the race of one *permanently covered with hair*, and that of the other as permanently covered with *wool?*—especially if (as has been shown) the difference between these integuments is not merely one of color and marking, (as in the cases of the horse and the ass, and the horse and the ass and the zebra,) but where the shape, direction, and inclination of the pile are different; where the disposition of the coloring matter is remarkably different; and, above all, where the number, shape, position, and mode of adherence of the scales of the cortex are so entirely different as to render the one altogether unfit for felting and fulling, and not liable to shrink; while the other is admirably adapted to felting and fulling, and liable to shrink. Take all these things into consideration, and then say whether there is not, at least, as much ground for believing these two animals to constitute two species as there exists in regard to the unity or plurality of the humps of the camel, or of the horns of the rhinoceros. And then, again, remember that, to establish this modification, there must be a difference of organization—a difference in the functions which the apparatus of each kind have, respectively, to perform: for instance, the fibres and cortex of the wool, while they subserve all the ordinary purposes which they do in hair, are also the medium of conveyance for the coloring matter of the former integument; while that of the latter flows in a central canal. "Species of plants (says Mills) are not only *real kinds*, but are, probably, all of them, *real lowest kinds*, or *inferior species*." And he adds, "I say *probably*, (not certainly,) because this is not the consideration by which the botanist determines what shall or shall not be admitted as a species; but which, consistently with experience, *might* have been produced from the same stock."* So that in the present instance, (seeing that the same law prevails in the animal commonwealth,) where the inquiry is—"whether the hairy sheep and the woolly sheep are not two distinct species?"—we are not bound to show absolutely that they are descended from different parentage, but only that, consistently with experience, they *might have* been descended from different parentages. And after having shown the difference between hair and wool, and having pointed out the character of the discrepancies upon which zoölogists have been in the habit of erecting species, we would confidently inquire whether any naturalist, who had presented to him two newly-discovered wild animals, otherwise alike, but one of which always produced wool and the other one hair, would hesitate to consign them to two specific departments? And if he would not, then why, in the case now before us, should we allow habit, born in ignorance and nurtured in stubbornness, to prevail over the dictates of reason and experience?

Let it not be supposed, from what has been hitherto said, that too little attention has been paid to the laws of physiology; for we do not believe that the zoological and physiological, and even the embryological, meanings of the word *species* materially differ. The author last cited remarks "that it seems to be a law of physiology that animals and plants do really, in the physiological as well as in the popular sense, propagate their kind, transmitting to their descendants all the distinction of *kind* (down

*By the adoption of this rule no inconsistency is introduced, for (as this learned author shows) this distinction, in most (and probably in all) cases, happily accords with the other.

to the most special and lowest kind) which they themselves possess." Now surely one of the distinctions of kind of the hairy sheep is to produce hair, and one of the distinctions of kind of the woolly sheep "is to produce wool." In like manner Agassiz, (in Prin. of Zool., p. 43,) says: "The constancy of species is a phenomenon depending on immaterial nature. Animals (and plants also) produce their kind generation after generation. We shall hereafter show that all animals may be traced back, in the embryo, to a mere point upon the yolk of the egg, bearing no resemblance whatever to the future animal. But even here," he adds, "an immaterial principle, which no external influence can prevent or modify, is present and determines its future form; so that the egg of the hen can produce nothing but the chicken, and the egg of the cod-fish can produce only the cod. It may therefore be said, with truth, that the chicken and the cod existed in the egg before their formation." Now although this learned author has given us examples drawn from two *classes* of animals, viz: the chicken and the fish, it is fair to presume that he also meant his observation to apply to animals of different *species*, but of the same class and order; and therefore that the hair of the hairy sheep, and the wool of the woolly sheep, according to his notion, depend upon an immaterial principle, which no external influence can prevent or modify. The question of species is therefore one of *fact*, and Dr. Morton was right when he said "all circumstances which tend to establish analogies are proper and necessary for the determination." We admit, when common parentage can be traced with certainty, that it constitutes the best evidence which the nature of the case allows; but he who would reject secondary evidence, when primary cannot be obtained, would place himself in the position of one who would shut his eyes to all other light, because he cannot always bask in the rays of the noonday sun. Between animals of the same species nature throws *no impediment whatever to free sexual intercourse*, and the progeny form a permanent self-supporting race of animals, which inherit equally the properties of both parents. But with animals of different species, there is a natural abhorence to amalgamate, which sometimes cannot be overcome at all, and with others exhibits itself in various ways and in various degrees; and the progeny are always incapable of securing a permanent and self-supporting race, in the proper sense of those terms. This is a most valuable rule for the determination of species, when properly understood and correctly applied; but, from inattention and inadvertence, it has been converted into a fruitful hot-bed of error, as will be hereafter shown in the proper place.

The common cow and the buffalo have a natural antipathy to each other; such is the fixed aversion formed between these creatures (as we are informed by Goldsmith) that the cow refuses to feed with the buffalo, which she nearly resembles. Wild asses (as we are told by the same beautiful author) live in herds, but they will not allow a horse to come among them; if, perchance, one strays into the boundary of their grazing ground, they fall upon him without giving him time to retreat; they kick and bite him until he is left exhausted on the spot. The baby-roussa, or East India hog, is often seen with the wild boar, with which, however, he is never known to engender; and the peccary of South America, although he herds will the wild hog, which he so much resembles, has never been known to breed with him. This is the voice of nature,

proclaiming, in unmistakable terms, her abhorence of the amalgamation of species.

How is it when man exerts the powerful influence of domestication? Sometimes even here all efforts to subvert nature are abortive. Buffon, for three years, kept a male water-dog and a she-wolf together, but they refused to have any intercourse. Goldsmith tells us that a similar experiment was tried with a fox and a dog; and the hare and the rabbit, though so nearly resembling each other in form and disposition, refuse to hold any communication. Buffon bred up several of both kinds together; but, from being at first indifferent, they soon became enemies, and they would sometimes combat until one was disabled or destroyed. How is it, it may be asked, with the horse and the ass? The mule, it is asserted, may be engendered by mixing either a horse and a she-ass or a jack and a mare. When the latter method, which is the one proposed, is resorted to, a horse is used as a teaser, and before the jack is brought forward the mare is hoodwinked. Is this the *free sexual intercourse* spoken of in the rule above quoted? But we have another question to ask in regard to this connexion, viz: Is the mule prolific? Is it capable of continuing the race? Goldsmith says, "that, from the great resemblance between the horse and the ass, one would be led to suppose that they are of the same species—that the ass was only a degenerate horse; but that they are perfectly distinct—an inseparable line having been drawn between them." He adds, "that it had been said by Aristotle* that the male mule was prolific; but that, after two thousand years' experience, this assertion had been modified; that others had said that in warm climates *female* mules are prolific; but that, upon examining the cases, it was found that such progeny were *incapable of continuing the race.*"

Fortunately, we have the reports of two cases which occurred in our own country; which, as they are exceedingly interesting, we will be excused for giving at large:

"John Thomson Kilby, of Springhill, Nansemond county, Virginia, was the owner of a female mule, which, on the 23d of April, 1834, was delivered of a male young one. She was not suspected of being with foal, and therefore it was not known what animal was the father; but suspicion alighted upon a three year-old colt belonging to Mr. Kilby, which had been allowed to run with the mules on Sundays; also, the young one resembled the colt. When born it was very lean; but its mother (although she had a small udder) having plenty of milk, it throve pretty well until the 20th of October in the same year, when (having been previously weaned) it was taken sick, and died of lock-jaw the following day. Another (female) young one was born of the same mule, on the same plantation, on the 13th of August, 1835, and died on the 26th of August, 1836, after having been sick two or three days only. It was in fine order; ran with its mother, which was doing nothing, in good pasture. When taken sick it had every medical attention paid to it; but it was found impossible to effect a passage through it; and, upon a post mortem examination, all the food and medicine were found in the stomach, none having ever passed into the intestines."

We recollect how, at the time, these two births were dwelt upon as

* He died 322 years before Christ.

proving the mule to be prolific; but we ask the intelligent reader whether they do not fall far short of the mark? They exhibit no ground to believe that such progeny can ever be the foundation of a permanent self-supporting race; which, as we have seen, is one of the conditions of the rule above quoted.

We will next refer to some cases of intercourse, or supposed intercourse, between the goat and the sheep, premising that, although the evidence in these cases is somewhat contradictory, yet its weight will lead us to a similar result. Smith (in Hist. of Man, p. 117,) says that "goats and sheep intermix, producing *permanently fertile hybrids*." But Bellchambers, in a note to Goldsmith's Nat. Hist. of Man, &c., p. 245, qualifies the above broad assertion as follows: "The sheep and the goat propagate. The buck goat is found to produce, with the ewe, an animal which, in *two or three generations*, returns to the sheep, and seems to retain *no marks of its ancient progenitor*." How the breeding goes on during these "*two or three generations*," we are not informed, but we take it for granted that the progeny are bred *towards the sheep*. Surely, no one would pretend, from this evidence, to aver that such hybrids were *permanently* fertile, much less that they constitute a *self-supporting race*. Now, let us see what the author of Illustrations of Nat. Hist., p. 151, with all these remarks before him, has to say upon the subject:

"Although the goat is a distinct *species*, and, possibly, further removed from the sheep than the horse is from the ass, yet the buck will propagate with the ewe. But although these intercourses happen very frequently, and are sometimes prolific, yet *no intermediate species* has ever been found between them." * * * "*No new* or *middle race has arisen* therefrom."

It seems, then, that all that we know with certainty is, that the goat and the sheep, in their domestic state, *frequently* have intercourse, and not that they have *free* intercourse, as exist between members of the same species; that this intercourse is "sometimes" (not uniformly) prolific, and that here the propagation, *per se*, ends. If you desire to continue the progeny, you must call in the aid of some one belonging to the original parents. And even this breeding is somewhat doubtful; for one of our correspondents, viz: Mr. Samuel Patterson, of Patterson's Mills, Washington county, Pennsylvania, in a letter to us upon this subject, says: "I have made inquiry, but have heard of no case of intercourse between the sheep and the goat being prolific. I have tried the experiment to some extent, myself, with the goat and the ewe, but without production. I have never seen the ram having intercourse with the she goat, although I have had them running together at tupping time. Mr. Plummer, a neighbor of mine, has made the experiment more fully than I have, but with the same result. I am perfectly satisfied that the fine woolled sheep (the woolly sheep) and the goat will not mix. I know of no case where it has been tried with the coarse hairy sheep." From all that has been said, we feel warranted in believing that the best rule we possess of discriminating between species is, to inquire whether nature has thrown *any impediment* between the animals to *free sexual intercourse*, and whether the progeny form a *permanent, self-supporting race of animals*, which inherit equally the properties of both parents. And we feel confident that a trial of the hairy sheep and the woolly sheep by

this law, in order to ascertain whether they are one and the same, or two distinct species, will result entirely in favor of the ground we have taken. Mr. Youatt, when speaking of the attempt in England to amalgamate the South Down sheep (which is itself a hybrid, being a mixture of the hairy and the woolly species) with the Leicester sheep, (which belongs to the hairy species,) pronounces it a *failure;* and he adds that the promised advantages to be derived from the South Down with the merinos WERE DELUSIVE. (See Essay upon Sheep, p. 233.) It is true that this author does not appear to be aware of the cause of this failure—one of the reasons why the expectations to which he has referred were delusive; but he has furnished us with the facts, and the inferences to be adduced from them, which are irresistible. Dr. Robert Knox, an English lecturer on anatomy, and corresponding member of the Natural Academy of Medicine in France, in a recent work upon the races of men, p. 52, says: "The theories put forth, from time to time, of the production of a new variety, permanent and self-supporting, independent of any drafts or supplies from the pure breeds, have been distinctly disproved. It holds neither in sheep nor cattle." And again, on page 68: "But the statement in question is not even true of sheep; for by no effort, saving that of constant, never-ceasing intermixture, or draft on the pure breeds, can a mixed breed be maintained."

So Colonel Randall (in Sheep Husbandry in the South, p. 170) admits, that any attempt to unite the merinos and the Leicester by crosses is an *unqualified absurdity*. It is true that this last gentleman (incautiously, as we presume) advises the crossing of the South Down and the merino; but such a crossing of a hybrid, formed from an amalgamation of the two species with the pure race of one of the species, is no less an "unqualified absurdity;" although the reason may not at first be quite so apparent to every one. We have not only the pleasure to hope, but the vanity to anticipate, that Col. Randall, after further reflection upon this important question, will agree with us in opinion. If he does not, we would like to hear *from himself* why the crossing of the South Down and the merino merits his recommendation, while the mixture of the merino and the Leicester is so inconsistent with reason and common sense. Having satisfied ourselves that the hairy sheep and the woolly sheep are members of *two species*, the next step in the inquiry is, What is the consequence of their amalgamation? Will it promote or mar the great object of the American sheep-breeder? Considering the very great extent to which sheep are now raised in the United States, and the general prevalence of crossing, these are important questions. The grand desideratum of the American sheep-breeder is, to form and preserve either one permanent and self-supporting race of animals—which shall inherit equally the good qualities of both parents, which shall produce, with the least trouble and expense, either the greatest quantity of the finest quality of fine, soft, and strong wool, which will felt and full in the greatest perfection, or the greatest quantity of the finest quality of fine, strong, and soft fleece, that will not shrink—or two races, one answering to either of these requirements. Now, to perform either or both of these, he must, in each flock, confine himself to one species; for as often as the parents are of different species, the offspring will be hybrids; none of which possess the power of permanently fixing and self-supporting a race such as has been mentioned. Among all animals, intelligent and instinctive, there exists a natural abhorrence

to the amalgamation of species; but it is exhibited in different ways. Sometimes the antipathy is so potent as to amount to an entire prohibition, as we have seen in the cases of the cow and the buffalo, the barbarousa and the wild boar, the peccary and the wild hog, when in their native state; and the dog and the wolf, the dog and the fox, and the hare and the rabbit, even when domesticated. At other times the antipathy is partially subdued—in a few instances out of many—by association, as the rare cases of marriages between a white person and a negro. And here every one of us must have been witnesses of the almost universal feeling of abhorrence of the community disgraced by such an outrage; often followed by an outbreak. That this is the effect of the natural feeling we have described, we rely upon Professor Samuel G. Morton, who tells us that it is not only proverbial among all European nations, but it is evinced by Africans in their own country; and upon Duncan, who, in his travels in Western Africa, relates several instances of the negresses running away in apparent fright and *disgust* at the sight of a white man.

At other times this natural abhorrence is overcome, either by domestication alone, or by domestication aided by the artifices of man, as in the case with the jackass and the mare. In like manner, nature makes known her non-conformity to this mixture in various ways. Sometimes the issue is absolutely sterile; at others the product is so mal-conformed that it cannot survive the period of lactation, as was the case with both the foals of Mr. Kilby's mule. Now the progeny are capable of being continued, but only by new drafts or supplies from the pure breeds from which it sprung, as was the issue of the sheep and the goat mentioned by Bellchambers. Then the progeny multiply among themselves for two or three generations only, and even during that time show no constancy of character, as mentioned by Van Amringe, (in Natural History of Man, p. 429,) who says: "We have devoted much attention to this subject, have examined a number of mulatto families, and are satisfied that the children seldom exhibit the medium color of the parents;" and in a subsequent page, (431,) he adds, that "in large families of mulattoes, (of half blood parents,) it is quite common to find several of the children as light-colored as if one parent was white, and another portion of the children as black as if one parent was a pure negro." All these different phases speak in different languages, but they all proclaim the same sentiment of natural abhorrence to the amalgamation of species; while by the connexion of two individuals belonging to the same species, the stock is uniform, permanent, indestructible, and ineffaceable; no change of time, food, climate, nor circumstances can materially alter it, much less sweep it away; as witness the cases of the Jews and Gipsies, whose races have outlived the records of the most ancient history. "It is by the exclusion of all foreign mixtures," says Humboldt, "that *species are preserved.*" And even Dr. Prichard, who has shown such anxiety to reduce the white man and the negro to the same category, tells us, (in Researches, &c., vol. 2, p. 341,) that "*separate species* of organized beings *do not pass into each other* by insensible degrees." What Van Amringe has remarked in regard to the variation of the *color of the skin* of the children of mulattoes, we have found to correspond in the diversity in the organization of the pile, which, sometimes corresponding with that of one parent, and at others with that of the other parent, and at others still resembling the pile of both in different filaments, furnishes ample proof that there does not exist that

joint inheritance of the characteristics of both parents, so remarkable where the progeny are derived entirely from one *species*. This experience ought to serve as a warning to the American sheep-breeder, whose object is to produce a race enjoying equally the good qualities of both parents. The natural disgust implanted in the minds of all animals to the mixture of species seems to have been wisely pre-ordained in order to *preserve* the purity and beauty of creation. By the *formation of species, order was proclaimed;* but it can be *maintained* by this natural feeling alone. Without such a feeling, the harmony of species throughout the immense varieties of created beings, which now people and beautify the earth, the air, and the sea, would be utterly destroyed, and the whole animal commonwealth would be converted into a disgusting assemblage of unsightly monsters. God has wisely and kindly given to each species of animals the intelligence, the instinct, and the organs exactly fitted for its respective station; but, by such a general amalgamation, his wisdom and kindness would be rendered entirely abortive, and his designs for the happiness of his creatures annulled. Organs would be taken away from animals to which they are invaluable, and conferred upon others to which they would be an incumbrance. Propensities which are the happiness of one species would be torn from them, to be possessed by another to make them miserable. It is no objection to our position that such crosses are sometimes allowed to be productive to a limited extent; for after the lapse of a few generations the progeny either pass over to the side of one or other of the progenitors, and the abnormal race is thus expunged forever from that polluted page of the fair volume of nature; or the breed, from the natural defect caused by this very amalgamation, runs out entirely, and is thus eventually lost. Every practising physician has had occasion to remark how much more mulattoes are liable to scrofulous and phthisical diseases, and similar wasting complaints, than either the whites or blacks, from whom they are descended; and we have no doubt but that the same law holds in regard to sheep when species are amalgamated. Now, this is destructive to the *permanency* of stock, which is one great object of the American farmer to insure. It little suits his purpose, after having paid for a high-priced ram, to have all his hopes of a stock blasted by an unwise crossing. • It is true that, by a repetition of the same causes—that is to say, by similar amalgamations—new hybrids may sometimes be continually produced, as in the case of mulattoes and mules; but they are subject to the same laws of destruction, and are doomed to the same premature decay and demolition. "With the cessation of the supply of European blood, (says Dr. Knox,) the mulatto of all shades must cease. He cannot extend his race, for he has no race—there is no place for him in nature." And Colonel Smith (in Natural History of Man, page 119) says: "We doubt exceedingly if a mulatto family does exist in any part of the tropics continued to the fourth generation *from any one stock*—perhaps there is not one, even in five generations, of positive mulattoes, but that all actually require, for continuity at least, a long previous succession of foreign influences—of white, or negro, or mestizo, or quadroon, or sambo, or native Indian, or Malay blood—before the sinew and substance of a durable intermediate race can be reared." Then how can the American sheep breeder reasonably expect, by crossing a Saxon ram with a common country ewe, to obtain a stock of *merino sheep?* We

know that sometimes hybrids are purposely produced, on account of an individual peculiarity which (notwithstanding their evanescent character) renders them, in some respects, more valuable than either of their progenitors. This is the case of the mule. But the same reason does not exist for producing the *hybrid sheep*, which possesses no such peculiarity, and is esteemed only in proportion to its similarity to its progenitor. In page 120, Colonel Smith says that "war and slavery are the elements of amalgamation, where mixed races spring up and are maintained until the impure fall a prey to the pure races—the former falling before the victors until they are exterminated, absorbed, and perish by a kind of decreasing vitality, and are entirely obliterated" From hastily reading the passage last cited, the reader might, perhaps, be led to infer that, in the end, no injury is done to the pure races, which are represented as swallowing up the impure ones; but this author adds: "Yet this *apparent* obliteration must ever affect subsequent forms and mental condition in the victors, which the physiologist ought to bear in mind when known, or indicate when only suspected." Therefore, let no American sheep-breeder flatter himself with the hope or expectation that by breeding *towards* a superior race he will ever be able entirely to obliterate the defects of an inferior one; if he does so, he will find, to his cost, a discomfiture—and that, perhaps, when he least expects it—that the obliteration is not real, but *apparent*, and that he has entailed a stigma upon his stock which no art nor time can wholly eradicate. In page 214, Col. Smith explains some of the names of hybrids from the crossing of white and black persons. He says: "A black and a white make a mulatto; a mulatto and a white make a quadroon; a quadroon and a white a mestee; a mestee and a white a *white*." But what kind of white is thus manufactured out of black and white? He tells us, "But this last has black and curly hair; nails dark and ill-shaped; feet badly formed, and much of the negro propensities." Now, Colonel Smith may call this a white if he chooses, but we would be very much afraid of marrying such a white, for fear of finding ourselves some day blessed with a *black heir;** and we think that, arguing from analogy, it would not be hazarding too much to predict, that if the (so called) *full Saxon sheep* we read and hear of, manufactured by breeding from an impure to a pure race, were critically examined, the vestiges of their impurity would be found still lurking in their veins.

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*Our learned friend, William F. Van Amringe, to whom we loaned the MS. of this chapter, returned it with the following valuable note: "*Black Heir.*—This unfortunate circumstance happened recently in ———. A gentleman of high respectability married a beautiful girl, whose first child was a *negro!* The fidelity of the wife was beyond suspicion; but, on investigation, it was discovered that her grandfather, or great grandfather, was a negro. Dr. White, a wealthy, educated physician, formerly of Dutchess county, in this State, [New York,] became possessed of a full-blooded Ayrshire cow, which, about 20 years ago, he put to a full-blooded Durham white bull. Subsequently, he bred continually in-and-in towards the cow, and boasted that he was practically disproving the decline of constitutional impairment by in-and-in breeding, notwithstanding my prediction that it would ultimately fail. It was remarkable, that for many years—say 12 or 15—the progeny uniformly leaned towards the cow, whose color and type were frequently reproduced; during which the color and type of the bull did not appear. Suddenly, a few years ago, the color and type of the bull exhibited themselves; and from that moment the impairment of constitution became manifest, and the extinction of the stock hastened. From this remarkable example I infer, that in crosses, so long as the constitutional energy of either parent predominates over that of the less vigorous parent, and manifests itself in the constitution of the progeny, propagation will continue; but the moment the constitutional energy of the predominating parent becomes reduced, to admit the alteration of the constitution of the less vigorous parent, the rapid extinction of the race is indicated."

It is not in the nature of things that adding to impurity begets purity. Gold added to copper never yet made *pure gold;* nor will pure blood added to impure make pure blood! "It is a law of nature (says Agassiz) that animals as well as plants are preceded by individuals of the same species only, and reproduction in animals is almost universally accomplished by an association of individuals of two kinds or sexes, male and female." But those who contend for the breeding we are now calling in question act upon the principle that *one kind only* can accomplish the reproduction—not only so, but they act upon the principle that they can select which of the two kinds (sexes) shall perpetuate its like; for if it is left to nature, and she selects the impure kind, then they admit that the stock is irretrievably destroyed. The law of species is so clearly laid down by Professor Wagner that we cannot withstand the temptation of transcribing a part of his essay: "Plants produced from different varieties of the same species are fertile; while *hybrids* either revert to the original character or become gradually less capable of reproduction, and within a few generations become entirely extinct." Doctor Prichard copies this passage into his Natural History of Man, followed by the remark that "the same law prevails in the animal kingdom," and Van Amringe confirms the opinion in the most unqualified manner. So you perceive that it is the acknowledged law of GOD, who has conferred on man, and other animals, the power of producing *others of their kind*, and of thus perpetuating their species, but not of *forming a new race*. "And God made the beasts of the earth *after his kind*, and cattle *after their kind*, and every thing that creepeth upon the earth *after his kind;* and GOD saw that it was good." The word *kind*, here found repeated, corresponds with the term *species*. Thus it appears that God saw that it *was good to create all animals in species*. It is God's attribute to create—man's to mar and destroy! Such artificial varieties as we have been condemning are natural deformities. Specific uniformity is beauty, and belongs to nature—emanates from her laws, and is the work of her hands. Every deviation from nature's type must necessarily be a *deformity*. It is one which she (if left to herself) will throw off—cast from her, as unworthy of support; but if the deviation is persisted in, it terminates in chaos. As sometimes it is allowed to argue from extremes, let us suppose, for a moment, that nature were to resign the reins of creation to man, what a picture would soon be presented: cows rioting in blood, while lions and tigers were grazing and chewing the cud; fishes clambering up trees, or building and inhabiting three-story brick houses; turkeys in uniform, strutting at the head of regiments of geese and fowls; hogs dressed in brocades and adorned with pearls and diamonds; while woman—lovely woman—is grunting Italian airs as she lies wallowing in mire!

And lastly, we must anticipate an objection which may, possibly, be made to our two-fold division of sheep—into the hairy sheep and the woolly sheep—viz: that there are sheep which are covered with both hair and wool. Now, suppose our opponents were able to demonstrate that these sheep belonged to a *third species*. This would, by no means, invalidate the position we have advanced. But we believe that the true answer to such an objection would be, that the hairy and woolly sheep are hybrids; like the mulatto, before noticed, exhibiting integuments bequeathed, respectively, by both their progenitors. It has been said that sheep

taken from one climate to another will partly change their coats—portions of the hair of some falling out and being replaced by wool, and portions of the wool of others falling out and being replaced by hair; for no one in his senses would contend that a single filament of either of these integuments can be transformed into the other.* Now, this change of coat never happens to either the *pure hairy sheep* or the *pure woolly sheep*, but is a condition of those hybrids which have already hair and wool. From all which we are decidedly of opinion that the American sheep-breeder—whose object is to lay the foundation of a permanent self-producing stock, (or, if he will, of two such stocks,) inheriting, respectively and equally, the good qualities of both their parents—should abstain from mingling together the hairy sheep and the woolly sheep. He ought to do so as a means of prudence, were it only that he incurred the *risk* of injuring the flock *a multo fortiori*, after we have positively proved that such crosses are unmitigated evils.

Are crosses of hairy and woolly sheep recommended to save expense of outfit? No outlay of capital can justly be considered as extravagant which has for its object to preserve a permanent purity of stock. Is it to save time? It is time *lost*, and not time saved, to commence by such abnormal crossing. When an architect is about to erect a noble superstructure, which may last for generations, he commences by laying a perfectly solid foundation, regardless of a moderate expenditure of time and money. The breeding and raising of sheep, and the producing of fleece, promise to be, in this country, a great and important undertaking. Let us not injure it by a hasty and inoperative plan of breeding.

We hope it will not be inferred from anything urged in this essay that we advocate *breeding in-and-in*. All that we contend for is, that the breeding shall be confined to the *species*, not to *families*.

In the preceding pages we have demonstrated that, where animals are of different *species*, (as we have shown the hairy sheep and the woolly sheep to be,) it is impossible by their amalgamation to produce a permanent, self-supporting race, possessing equally the properties of both parents. We now propose to prove that, even when they are not of two species, but of only different *varieties* of the same *species*, all attempts to produce such a race are abortive.

"*Varieties*, (says Dr. Bachman,) once formed, may produce *other varieties*, or they may *sink into degeneracy and perish;* but they CANNOT AGAIN BE BROUGHT BACK TO THE RACES FROM WHICH THEY ORIGINATED." Then the American farmer who crosses the merino or Saxon-merino blood with the common country sheep—because somebody has told him that they are *varieties* only of the same species of animal, and that, by constantly breeding their issue towards the merino or Saxon-merino, he may, in a few generations, extinguish the blood of the common country race—will find himself still wide of his mark; he has forsaken the direct road, which would have surely brought him to the desired goal, for a crooked and uncertain path, in which all his labor will be unsuccessful.

Nothing can be more explicit to this point than the above quotation from Dr. Bachman, unless it be his concluding remark, viz: "No BREED OF COWS, SWINE, OR BIRDS, HAVE EVER REVERTED TO THE ORIGINAL FORMS." And it is certain that he would not have hesitated to have included *sheep*

*Mr. Latham (in Natural History of Man, page 62) speaks of the hair *changing;* but his views are not explained.

in his list, had the suggestion been made. The idea that the impure blood, by mixing with the pure, can be entirely annihilated is unphilosophical. "Like streams that flow onward, like fragments of rock torn from their native precipices, like metals changed by the chemists, the elements still exist, but in other forms; they are not annihilated, but have entered into new combinations, *never to return to their original sources*."—*Bachman*.

To this point numerous other authorities might be adduced, but we will content ourselves with the two following: Dr. Pickering says, "*Varieties do not revert to their original type;*" and even Dr. Prichard admits that "*the smallest varieties, once produced, are never again obliterated.* This (he says) would seem to be one of the mysteries of nature: we may compel her to *place her signet*, but we know not how to force it off again. Man, like the magician, or half-skilled scholar, (so beautifully described by the German poet,) often possesses the skill to compel her to work, but has not yet learned that which may oblige her to desist." This is beautifully exemplified in the case of the *horse*. The Arabian is the finest race in the world; in his own country no one ever thinks of crossing the breed—on the contrary, the pure blood has descended uncontaminated through successive generations; but in this and other countries, where the practice of amalgamation with other races prevails, they have endless varieties of this noble animal, but no pure Arabian race. But in regard to sheep, the American farmer, being now forewarned, is forearmed; and we anticipate that, with the exercise of that good sense for which our countrymen are remarkable, they will cease to pursue a practice that has been proved to be erroneous.

What would one of them think of a chemist, who, being possessed of two liquids, one oleaginous and the other aqueous, both of exceeding great value, should mix the two together and destroy both? And yet the sheep-breeder who mingles the hairy sheep and the woolly sheep, is guilty of a greater absurdity.

Let those persons who affect to despise what they term "book knowledge" (if all such have not been *weeded* out of the garden of agriculture) remember that the distinction made by us between the hairy sheep (whose fleece will not felt nor full) and the woolly sheep (whose covering will do both) is not only scientifically correct, but is one of exceeding great practical importance as regards manufactures and the arts. We next propose to show, by arguments drawn from experience—that great instructor in everything which relates to natural history, that the true way of breeding sheep is to preserve the two species distinct. We will commence with Saxony. The kingdom of Saxony is situated in the east of Germany. It is bounded on the northeast by Prussia; on its southeast border is the Erzberg mountains, which separate it from Bohemia; on the west it has Prussia and the Saxon Duchies; it is divided into four circuits, viz: Bautzen, Dresden, Leipzig, and Zwickau. These circuits are respectively divided into counties; in the circuit of Bautzen there are two counties, viz: Bautzen and Zittau; in Dresden there are four counties—Dresden, Meissen, Hayn, and Freiberg; in Leipzig there are three counties—Borna, Rochlitz, and Grimma; and in Zwickau there are five counties—Chemnitz, Zwickau, Niederforchheim, Plauen, and Glauchau. Saxony is the smallest kingdom in Europe, containing, according to some writers, 5,800, and, according to others, only 5,640 square miles. She has, then, about one-eighth of the territory of Pennsylvania, and about

one-eleventh of that of Virginia; but she has a population of 1,600,000; and it is calculated that she has 25,000 000 of sheep.

The Saxons sell their sheep and export immense quantities of wool, notwithstanding which their manufacture of wool employs 25,000 persons. But the subject to which we desire at present to call the more particular attention of the American people is the exceeding great fineness of the Saxon wool, which, considering that this quality is generally indicative of all others estimable in fleece, demands serious attention.

The King of Saxony has recently presented us with several hundred specimens of fine wool, grown in various parts of his kingdom. These we have subjected to strict examination, and find that they all possess a high degree of fineness, a large majority of them having the maximum of that known to wool grown upon the body of a sheep. How came Saxony possessed of this superior breed, since, according to the celebrated agriculturist, M. Thaer, there were no less than three varieties of sheep in Germany before the introduction of the merinos, neither of which was held in high estimation? The answer to this question is, that in 1765, Augustus Frederick, then Elector of Saxony,* imported 200 merinos from Spain; they were placed at Stolpgen, in the county of Hayn and circuit of Dresden, then one of the most populous and best-cultivated districts in that country. Popular prejudice for some time ran high against them, but it gradually subsided, and in 1777 they had grown into such estimation that an agent was sent for 300 more; 110 only could be obtained, but they were selected from all the best flocks in Spain, particularly from that of the Escurial. Then commenced two other establishments, viz: that of Rennersdorf, in the county and circuit of Bautzen, and of Lockmühle, in the county of Niederforchheim and circuit of Zwickau. In this manner the foundation of sheep-breeding was laid in Saxony; but the noble superstructure raised upon it would never have been presented but for the rigid adherence to the rule of *never mingling these merinos with the common sheep of the country*. By these means a pure breed of full-blood merinos was raised all over Saxony; and it is from their descendants that our specimens, which attract the attention and admiration of all beholders, were obtained. We challenge the inspection of these specimens, which are all of fine wool, not a hair to be found in the whole collection. What a lesson is here taught to the American sheep-breeder! We have collections of fleece from some other foreign countries which we might bring into contrast, but we wish to avoid all invidious comparisons.

Our next exhibition and proofs are from persons and places nearer home. We have specimens of fleece grown in the following States, viz: Massachusetts, Connecticut, Vermont, New Hampshire, New York, Michigan, Wisconsin, Pennsylvania, Ohio, Virginia, Tennessee, Illinois, Alabama, Mississippi, and Texas. Most of these are accompanied by letters from sheep-breeders and others. From this correspondence, as well as from sundry letters addressed to the Commissioner of Patents, we have extracted all that regards sheep-breeding; and from the whole we are enabled to pronounce that in the United States the hairy sheep and the woolly sheep live and thrive in different places, the position which

*The former duchy, an electorate was changed to a kingdom by Napoleon about 42 years ago.

is the most appropriate for the one being inappropriate for the other species. So it appears that there is not only a season and a time for every purpose under Heaven, (Eccles., ch. iii., 6 to 8,) but also there is a place for all natural things; there is a place to breed and raise the hairy sheep; and there is a place to breed and raise the woolly sheep; but for the hybrid sheep, which is not a *natural*, but an unnatural production of man's making, there is not (as we shall proceed to show) any place in the United States; and therefore their propagation ought not to be encouraged. If a line be drawn diagonally through the United States, beginning at the southeast corner of New Hampshire, pursuing pretty much the course of the line of tide-water, and ending in Texas, it will be found that everywhere northwest of it the woolly sheep may be bred and will thrive, provided the blood of his species be kept pure; and everywhere southeast of this line the hairy sheep may be bred and will thrive, provided the blood of his species be kept pure; but that neither will thrive on the other sides, respectively, of that line, nor will they if the species are crossed.

Postscriptum.

Peradventure some persons may imagine that we (although professing to be a collector of facts only) are bound to assign a *reason* for this phenomenon. It might be difficult to do so: "*Felix qui potuit rerum cognoscere causas.*"

It might be attributed to the action of the atmosphere in the neighborhood of the sea, acting injuriously upon the delicate, fine-woolled sheep, when it is attempted to raise them on the southeasterly side of the line we have projected. The merino thrives and improves in the interior of continental Europe—as, for example, in Saxony; but remove them to England, and they dwindle. It might be assigned to geological causes, for the line we have drawn points out the general direction of the great rock formations of the United States. The *subsoil* of a country depends for its composition on the underlying rock, of which such subsoil is nothing but its comminuted fragments. Each natural soil has its natural vegetable growth, and it is well-known that sheep, more than any other of our domestic animals, subsist upon the *natural* vegetable productions of the country. It might be assigned to other causes more remote. But be all this as may hereafter be developed, the *fact* is as we have stated. He who would refuse to be admonished by it because a *reason* cannot be assigned, or the *modus operandi* pointed out, would place himself in the position of one who would persist in swallowing poisons because we cannot tell *how* they produce death.

WOOL GROWING.

[From the "Wool Grower."]

Why not grow more wool?—It has been the aim of this journal to so awaken the attention of farmers as to enable them to adopt the most profitable system. We have, therefore, urged upon them, from time to time, an increase of their flocks of sheep. Our own experience and observation have satisfied us that there is no kind of farming that is so generally profitable as raising sheep and wool. It matters not whether you are upon the bleak mountains of Vermont or in the fertile plains of Texas,

upon the prairies of the West or the now solitary hills and mountains of the South—everywhere and anywhere the sheep will live and thrive, and, with proper care, pay more for the labor and capital invested than any other animal or any other system of farming. It is one of the most useful and economical modes which have been given us to convert the vegetation of the farm to money. Were it for the first time now presented to us, we should consider the sheep one of the most wonderful animals nature has produced for the use of man. Its annual growth of wool, so admirably calculated for human clothing and use in every portion of the globe, its skin and flesh, and, in many localities, its milk—all serve for the necessaries or luxuries of man. There is no animal in which there is so little waste or so little loss. For at least seven years of its life it will give an annual fleece each year to the value of the carcass, and the yearly increase will be nearly or quite equal to the cost of keeping, giving, as a general thing, a profit of cent per cent. Of all the other animals, the cow comes nearest to the sheep in the profit it returns to the farmer if well cared for; it will pay for itself each year by the milk it yields, and defray also the cost of keeping.

Is there any branch of farming or any other kind of legitimate business that will yield for a series of years a profit of 10 per cent? We assume that there is none. The very idea that a profit of 50 per cent. could be realized in any branch of business would set the whole capital of the country in motion. Farms would be sold, merchants would sell off their stocks, bankers close their banks, and, indeed, everybody who had money to invest would rush into this gold mine.

We aver, without fear of contradiction in truth, that there is hardly locality in the whole Union, where any kind of farm animals can subsist, that the sheep, if properly attended to, will not give a net profit on the investment of at least 50 per cent., and that, with the ordinary management of farms, it will give some 20 to 40 per cent.

That there is no danger of overdoing the business, we have shown repeatedly in previous numbers. The annual increase of population in the Union requires the wool from three millions of sheep; so that, to clothe the increased population, would require an annual increase of sheep equal to four millions. But when we come to consider that there is now an annual deficiency of over seventy millions of pounds, there can be no doubt that wool growing is the most stable pursuit that can be engaged in. We cannot glut the market, nor will there be any long time that the market will be depressed below a point of profitable production. On the contrary, it is certain that no farm product goes less below this point than wool. It has long been a source of constant wonder to us that so many farmers in the western States neglect the sheep for the very precarious business of grain-growing. Every year will give them a crop of wool if they do but take care of their sheep. But there is no certainty for wheat, prepare the ground ever so well. If we have been rightly informed, the wheat raised in the West has cost the farmer more than he has obtained for it in market. Too much dependence has been placed upon this most uncertain and expensive crop.

We have tried wheat-growing upon probably as good a wheat farm as can be found in western New York, and we have also tried sheep upon the same farm; and we are free to confess that, although we have a good market at our own door, yet we can raise a given amount of money

quicker and much easier with a flock of sheep than with wheat. But we find it well to raise both sheep and wheat, as by that means we find we get a better profit than to be confined to either alone. With us, and in this region, four years are as long as it proves profitable to leave land to grass. Very few now resort to naked fallows. Some mow their clover early, and then let it grow till August, when it is turned under, cultivated, and sown to wheat; others mow the first year, and pasture with sheep the second, and then plough.

Every good farmer keeps a few good sheep at least. Very many who have been in the habit of putting up a large quantity of pork for summer use now select out a few wethers and give them extra keep, and make their summer meat of mutton, decidedly the most healthful that can be used, and thus realize the money for their pork fresh. The inducements to grow more wool are: a sure market, less fluctuation from the point of profitable production than any farm product, a larger interest or profit on the capital invested than any other business, and, therefore, the best business, as a general thing, that the farmer can follow. We ask our subscribers to give us their views on the subject.

HISTORY OF THE OHIO COMPANY FOR IMPORTING ENGLISH CATTLE.

[The following article by the Hon. John L. Taylor, of Ohio, is inserted at the request of several members of Congress :]

On the 2d November, A. D. 1833, Governor Allen Trimble, George Renick, Esq., and General Duncan McArthur, citizens of the State of Ohio, for the purpose of promoting the interests of agriculture, and of introducing an improved breed of cattle into this State, formed a company, and they, together with the subscribers hereafter named to the written articles of their association, contributed the amount of money necessary to import from England some of the best improved cattle of that country.

The sum of $9,200 was very soon subscribed for that purpose, in 92 shares of $100 each; and after making the necessary preliminary inquiries and arrangements, the company appointed Felix Renick, Esq., of Ross county, Ohio, their agent for the purchase and importation of said cattle

Mr. Felix Renick was accompanied by Messrs. Edwin J. Harness and Josiah Renick, of Ohio, as his assistants, and they left Chillicothe for England on the 30th January, 1834.

The following persons were subscribers to the stock of said company on the 25th day of January, 1834, viz :

Allen Trimble	5	shares	$500
George Renick	6	"	600
Duncan McArthur	6	"	600
John J. Van Meter	2	"	200
R. R. Seymour	2	"	200
Edwin J. Harness	2	"	300
Arthur Watts	3	"	200
Robert Stewart	1	"	100

Strawder McNeil	2	shares	$200
Preslay Morris	2	"	200
James Vanse	1	"	100
Evan Stevenson	1	"	100
Thomas Huston	3	"	300
John McNeil	3	"	300
John M. Alkive	1	"	100
Elias Pratt	1	"	200
William Renick, jr	2	"	100
Josiah Renick	1	"	100
Thomas Renick	1	"	100
George Radcliff	1	"	100
Elias Florence	1	"	100
Asahel Renick	2	"	200
Felix Renick	2	"	200
H. P. Galloway	1	"	100
John Boggs, sen.	1	"	100
John T. Webb	2	"	200
Batteal Harrison	1	"	100
A. Hegler and M. Paterson	1	"	100
Wesley Claypoole	1	"	100
Archibald Stewart	1	"	100
Joseph G. White	1	"	100
John Pancake, sen	1	"	100
Bodkin J. Davis	1	"	100
Charles Davis	1	"	100
Asahel Renick and E. Pratt	1	"	100
E. W. Gynne	1	"	100
M. L. Sullivan	1	"	100
Lyne Starling	2	"	200
S. S. Denny and Wm. Renick	2	"	200
M. McCrea, assign. to Harness Renick	1	"	100
Jonathan Renick	3	"	300
Francis Campbell	1	"	100
William Renick	1	"	100
John L. Taylor	1	"	100
John Crouse	1	"	100
John Foster	1	"	100
R. R. Seymour, for W. H. Cunningham, of Virginia	4	"	400
James Vanse, for Isaac Cunningham, of Kent'y	8	"	800
No. of shares	92		9,200

Mr. Felix Renick, and his assistants, Messrs. E. J. Harness and Josiah Renick, proceeded to England, and made a careful examination of much of the improved stock of that country, purchased from some of the most celebrated and successful breeders of cattle in England about nineteen at various prices, consisting of bulls and cows, of the *thorough-bred short-horned Durham stock.* They brought these to Ohio, and returned in time to exhibit them at the Agricultural Society of Ross county, on the 31st day of October, 1834.

This stock of English cattle was kept together, under the care of an agent, by said company, and they *increased the number, by additional importations from England, until the 20th day of October, A. D.* 1836; when the cattle imported, as well as the natural increase thereof since the 31st October, 1834, were sold at public auction, under regulations adopted by the company.

The following extract, from "The Scioto Gazette of October 26, 1836," will show the names of the purchasers, and the prices the stock brought at public sale:

GREAT SALE OF DURHAM STOCK,

Imported by the *Ohio company for importing English cattle* in the years 1834, 1835, and 1836, held at Indian Creek farm, the residence of Felix Renick, esq., agent of the said company, in Ross county, on the 29th day of October, 1836. The stock of the company was in fine condition, and in great demand.

Notwithstanding the high prices at which the cattle were sold, some of them exchanged owners immediately, at very considerable advances; and, for others, more than 50 per cent. on their cost was offered and refused.

Reformer, a bull, not sound, sold to John T. Webb, of Ross county, O., for - - - - - - - - $48
Matchem, a bull, sold to Abraham Renick, of Kentucky, for - 1,200
Earl of Darlington, sold to Batteal Harrison, of Fayette county, O., for - - - - - - - - - 710
Young Waterloo, a bull, sold to R. D. Lilley, of Highland county, O., for - - - - - - - - - 1,250
Duke of York, a bull, sold to R. R. Seymour, of Ross county, O., for - - - - - - - - - 1,120
Experiment, a bull, sold to James M. Trimble, of Highland county, O., for - - - - - - - - 1,150
Comet Halley, a bull, sold to R. R. Seymour, of Ross county, O., for - - - - - - - - - 1,505
Whitaker, a bull, sold to Wm. M. Anderson, of Ross county, O., for - - - - - - - - - 855
Nimrod, a bull, sold to Elias Florence, of Pickaway county, O., for - - - - - - - - 1,040
Duke of Norfolk, a bull, sold to Robert Stewart, of Ross county, O., for $1,225; afterwards sold, at private sale, to Governor Vance and J. H. James, of Champaign county, for - - 1,400
Goldfinder, a bull, sold to Isaac Cunningham, of Kentucky, for - 1,095
Duke of Leeds, sold to John Crouse, jr., of Ross county, O., for 575
Windham, a bull, sold to Charles Davis, of Ross county, O., for 500
Columbus, a bull, not sound, sold to Thomas Huston, of Pickaway county, O., for - - - - - - - - 180
Davy Crockett, a bull, sold to Peter L. Ayres, of O., for - - 490
Snowdrop, a bull, sold to Stewart and McNiel, of Ross county, O., for - - - - - - - - - 480
Independence, a bull, sold to Hegler and Peterson, of Ross county, O., for - - - - - - - - - 400

Perry, a bull, sold to William H. Creighton, of Madison county, O., for - - - - - - - - - $400
Goliah, a bull, sold to Isaac V. Cunningham, of Scioto county, for 300
Logan, a bull, sold to Elias Florence, of Pickaway county, O., for 750
John Bull, a bull, sold to William Renick, jr., of Pickaway county, O., for - - - - - - - - - 615
Paragon, a bull, presented by the company to Felix Renick, esq., their agent.
Powhattan, a bull, sold to George Renick, sen., of Ross county, O., with Flora.
Rantipole, a bull, sold to Arthur Watts, of Ross county, O., for - 810
Gaudy, a cow, sold to James A. Trimble, of Highland county, O., for - - - - - - - - - 985
Blossom, a cow, sold to R. R. Seymour, of Ross county, O., for 1,000
Flora, and her calf, Powhattan, were sold to George Renick, sen., of Ross county, O., for - - - - - 1,205
Lily of the Valley of Tees, sold to Thomas Huston, of Pickaway county, O., for - - - - - - - - 950
Matilda, sold to Arthur Watts, of Ross county, for - - 1,000
Calypso, a cow, sold to Strawder McNiel, of Ross county, for - 325
Young Mary, and her calf, Pocahontas, were sold to Edwin J. Harness, of Ross county, for - - - - - 1,500
Lady Blanch, (no proof of this cow being a breeder,) sold to Charles Davis, of Ross county, for - - - - 250
Teeswater, and her calf, Cometess, sold to John I. Van Meter, of Pike county, O., for - - - - - - - 2,225
Duchess of Liverpool, sold to William M. Anderson, of Ross county, O., for - - - - - - - 570
Lady Colling, (it is doubted whether this cow will ever be a breeder,) sold to John T. Webb, of Ross county, for - - 205
Beauty of the West, sold to Asahel Renick, of Pickaway county, O., for - - - - - - - - - 900
Lilac, sold to Elias Florence, of Pickaway county, O., for - 425
Lady of the Lake, sold to R. R. Seymour, of Ross county, O., for 775
Lady Paley, sold to Alexander Renick, of Ross county, O., for - 510
Poppy, sold to Harness Renick, of Pickaway county, O., for - 610
Pink, sold to William Trimble, of Highland county, O., for - 575
May Flower, sold to Batteal Harrison, of Fayette county, O., for 405
Lucy, (pedigree doubtful,) sold to George Ratcliff, of Pickaway county, for - - - - - - - - 405
Moss Rose, sold to Jonathan Renick, of Pickaway county, for - 1,200
Celestina, sold to T. Huston, of Pickaway county, for - - 930
Malina, sold to Isaac Cunningham for - - - - 1,005
Illustrious, sold to Abraham Renick, of Kentucky, for - - 775
Lady Abernethy, sold to Thomas Huston, of Pickaway county, O., for - - - - - - - - - 815

Attest: JOHN L. TAYLOR,
Secretary of the Ohio Importing Company.

On the 1st of April, 1837, at a meeting of said company at Chillicothe, upon a settlement of the business of the company, a dividend of

$280 per share was declared on the 92 shares of the stock of said company, amounting to $25,760.

This company held their last meeting on the 15th April, 1837, and settled finally the business thereof, so far as was practicable, by ordering a second sale, which was held as follows:

"The highest prices yet."

A sale of seventeen head of improved short-horned cattle, belonging to the Ohio Company, being mostly of this year's importation, and the produce of others, took place at the Sugar Grove, in this town, on Tuesday last. The attendance was numerous, comprising a larger number of actual bidders than the previous sale. Among the individuals present who are pre-eminently noted for their agricultural enterprise, were Governor Vance, Ex-Governor Trimble, the Messrs. Renick, Mr. Sullivant—and, indeed, nearly all the large farmers of this valley and the adjacent country. The bidding was, consequently, very spirited, and the prices obtained for the cattle plainly show that the kind of stock sold is rapidly advancing in public estimation. By the following list from the auctioneer's book, our brethren of the press will discover that the cattle enumerated were even more highly valued than those of the *sham sale* they were of late parading in their columns, copied from the "Cincinnati Gazette:"

Bulls.

Acmon, three years eight months, M. L. Sullivant & Co., Columbus	$2,500
Comet Halley, five years, George Renick & Co., Chillicothe	2,500
Hazlewood, one year six months, Allen Trimble and R. R. Seymour	700
Bouncer, one year seven months, John Walke, Pickaway county, Ohio	453
Powhattan, one year nineteen days, Harness Renick, Pickaway county, O.	500
Santa Anna, three months twenty-one days, Joseph C. Vance, Ohio county, Va.	425

Cows.

Flora, seven years six months, M. L. Sullivant, Columbus	1,300
Matilda, six years six months, Allen Trimble, Highland county, Ohio	1,220
Fidella, seven months eighteen days, Allen Trimble, Highland county, O.	610
Elizabeth, (and calf,) five years, J. & Wm. Vance, Champaign county, O.	1,450
Charlotte, four years seven months, Joseph G. White, Ross county, O.	630
Arabella, (and calf,) three years seven months, Arthur Watts, Chillicothe	1,200
Blush, two years nine months, John H. James, Champaign county, O.	1,015

Emily, two years eight months, Asahel Renick, Pickaway county, O. - - - - - - - $875
Victoress, one year nine months, M. L. Sullivant, Columbus - 700

Very great benefits have resulted to the country by the introduction of this improved English Durham stock into the State of Ohio by this company.

An improved breed of cattle throughout the State has resulted from crossing the English stock with the common stock existing at that time; and a very fine, large, and thrifty race of cattle in many parts of Ohio has been bred by this laudable enterprise. Some of their full blood bulls and cows have been sold to farmers of the adjoining States; and thus the benefits of their importations have contributed largely to improve the stock of cattle in the western country.

Mr. George Renick, of Ross county, has bred, from a portion of the stock imported by said company, and the common cows of Ohio, a very fine race of cattle; and for the last six years, as he states, he has annually sold about 50 or 60; the average weight of which, at from three to four years old, was about 1,000 pounds net. Some of them weighed as much as 3,000 pounds, and one (older) as high as 3,400 pounds, gross.

Ex-Governor Allen Trimble, of Highland county; Doctor Arthur Watts, of Ross county; M. L. Sullivant, esq., of Franklin county—all well known as amongst the most successful farmers and stock-growers in Ohio—besides many others of this company—have contributed largely, by their skill and enterprise, to increase and diffuse the improved breed of cattle, resulting from the importations of the company, into every part of this State.

Doctor Watts, at the last agricultural exhibition in Ross county, in 1849, exhibited eight two-year old steers, averaging 1,526 pounds each; and at the State agricultural fair at Cincinnati, held in 1850, he exhibited, amongst other cattle, one four year-old steer, (full blood Durham,) weighing 2,550 pounds, gross; and one three year old steer, weighing 2,220 pounds, gross. These weights are given to show the enormous weight which this Durham stock of English cattle attain at an early age when bred by skilful and intelligent farmers; and they show, also, the great value of breeding from this stock to those who are engaged in furnishing the beef markets of our country.

IV.

AMERICAN RUMINANTS.

ON THE RUMINATING ANIMALS OF NORTH AMERICA, AND THEIR SUSCEPTIBILITY OF DOMESTICATION.

BY PROF. S. F. BAIRD, OF THE SMITHSONIAN INSTITUTION.

In the present paper we propose to present, in a few words, the principal characteristics of the ruminating animals of North America, with especial reference to the economical employment of several species, as beasts of burden or draught, as furnishing food of excellent quality, or as yielding valuable materials for the useful arts. It is a little singular that, in the many years during which the ruminating animals of North America have been known, so little effort has been made to render them subservient to the uses of man. The experiments, when tried, have yielded satisfactory results, even in the first and second generations; but, unfortunately, the continued training of one species for a long succession of years has not been accomplished. It is not too much to suppose that the time may come when much of this continent, now desolate, and supporting a scanty and half-starved population, may become a populous region, filled with towns and villages, and owing much of its prosperity to the employment of some of our own native animals in a state of domestication.

For further remarks on this subject, we would refer especially to the articles in relation to the moose and caribou.

We must not be understood as having anything new to present in regard to the habits or history of these animals. The materials employed are mainly derived from the valuable works of Lewis and Clarke, Audubon and Bachman, Richardson, King, and others, who have had the opportunity of seeing the various species in their native regions. The minute questions of specific characters, too, we shall merely glance at, confining ourselves to the practical part of our subject, and referring to the works above-mentioned for detailed descriptions.

The ruminating animals of North America belong mainly to the divisions of the deer, the antelope, the sheep, the goat, the bison, and the musk ox. The list specifically is as follows:

1. *Tarandus arcticus*, Rich. Barren Ground reindeer.
2. *Tarandus hastalis*, Agassiz. Woodland Caribou reindeer.
3. *Alces Americana*. Moose.
4. *Elaphus Canadensis*, Ray. Elk.
5. *Cervus Lewisii*, Peale. Black-tail deer.

6. *Cervus macrotis*, Say. Mule deer.
7. *Cervus Virginianus*, Pennant. Virginia deer.
8. *Cervus leucurus*, Douglass. White-tail deer.
9. *Antilocapra Americana*, Ord. Prong horn antelope.
10. *Capra Americana*, Blainville. Mountain goat.
11. *Oris montana* Desm. Big horn.
12. *Bison Americanus*, Cm. Buffalo.
13. *Oribos moschatus*, Blainville. Musk ox.

TARANDUS ARCTICUS, Rich. *Barren Ground Reindeer.*

The probable existence of two species of caribou in North America has been suggested for a long while, the features of distinction being sufficiently marked to convey the idea to all those who were acquainted with them of at least two strongly marked varieties. The difference is to be found mainly in the much smaller size of the Barren Ground species, yet having considerably longer, though very slender antlers, the existence of a gall bladder, and a very different geographical distribution. It is confined almost entirely to the *Barren Grounds*, the north-eastern corner of North America along the Polar sea, bounded to the west by Great Slave, Athapasca, Wollaston, and Deer lakes, and the Copper-Mine river, and to the south by Churchill river.

The name is derived from the scarcity of wood throughout almost the entire extent, excepting in the vicinity of some of the streams. There are, indeed, shrubs and bushes, some of full size, others stunted trees; but these are not suitable for fuel or other economical purposes. A striking physical feature of the Barren Grounds consists in the succession of small lakes in narrow valleys, and connected by rapid streams, offering, in many cases, serious impediments to the passage of boats. All abound in fish, principally salmonoid, as trout, whitefish, and grayling, in numerous species. The borders of these waters are inhabited by a few half-starved, miserable Indians, in the depths of poverty and degradation.

Here the Barren Ground reindeer graze by thousands, accompanied by the musk ox—another characteristic inhabitant. Both are enabled to exist in winter only in consequence of the great quantities of reindeer moss.

The second and larger species of reindeer is as characteristically found in the *Woody District*—a region covered with wood, and reposing upon a narrow belt of primitive rocks. This is about two hundred miles wide, and is included between the Barren Grounds and the north shore of Lake Superior, extending also to some distance both east and west. Indeed, the features of this region are not lost in New Brunswick, nor even in the northern part of Maine, where caribou are found in vast numbers, as well as elsewhere.

No other species than the Barren Ground caribou is found in the region inhabited by it. Occurring as it does by thousands, it is termed the common deer by the hunters, just as the *Cervus Virginianus* bears this name in the United States. In no instance is the danger of relying upon the trivial name of an animal for the determination of species more fully

shown than here, where two such totally distinct species, economically, geographically, and zoologically, are presented under a common name.

The *Tarandus arcticus* is not confined, however, to the Barren Grounds of America. It occurs in Greenland, whence specimens have been received by the Smithsonian Institution; it is found in Spitzbergen also.

In size it is exceedingly diminutive, the does being not much larger than a good sized sheep. When fat, the bucks weigh, cleaned, from 80 to 125 pounds, and occasionally more. The species agrees with all other reindeer in the presence of horns in both sexes, although in the females and young males, they are less palmated; in all, they are slender, and have the stem much elongated. Most males have one or other brow antler developed, with a broad vertical plate extending forward between the eyes; occasionally, however, this is wanting.

The horns of this species follow the common law, and fall off annually. In a few months these are reproduced, becoming hard as they increase in size; and when they have attained their full growth, the hairy covering peels off in ragged filaments, which is a sure sign of the fatness of the animal, and generally takes place in the males between the months of September and November. The bucks generally shed their horns in January, although in some cases they retain them considerably longer; while the does cast theirs in the spring, at the time they drop their young. The coat of hair is shed in July. The shortness of the hair of the caribou, and the lightness of the skin when properly dressed, render it the most appropriate article for winter clothing in high latitudes. The skins of the young deer make the best dresses; and the animals should be killed for that purpose in August, as after that month the hair becomes long and brittle. They are so drilled into holes by the larvæ of the gad-fly that eight or ten skins are required to make a suit of clothing for a grown person. But the skins are so impervious to cold that, with the addition of a blanket of the same material, any person may bivouac in the snow with safety, and even with comfort, in the most intense cold of an arctic winter's night. The hoofs of this variety of reindeer are wonderfully adapted to the country it inhabits; for, instead of being narrow and pointed, like those of the roebuck or fallow deer, they are broad, flat, and spreading—a formation not only useful in preventing the animal from sinking in the winter so deep as it otherwise would do, but in shovelling away the snow from off the lichens clothing the rocks of the Barren Grounds, on which substance it feeds. They are, however, saved that trouble when driven to the woods for shelter, where they find a species of lichen hanging from the trees, which, from that circumstance, has been called reindeer moss.

In June, when the sun has dried up the lichens, the deer are to be seen in full march towards the sea-coast to graze upon the sprouting carices and withered grass or hay of the preceding year, which, at that period, is still standing, and retains part of its sap, in all the moist places covering the bottoms of the narrow valleys on the coasts and islands of the Arctic sea. Having dropped their young, they commence their return to the south in September, and reach the vicinity of the woods in October, at which time the males are in good condition, and there is a layer of fat deposited on the back and rump to the depth of three or four inches, and frequently five or six immediately under the skin, designated *dépouille* by the Canadian voyageurs; this fat disappears in about a

month, when they become very lean and insipid as food. The females, however, which at that period are lean, acquire, in the course of the winter, a small *dévouille*, which lasts till they drop their young. The reindeer supplies the Chippewyans, Copper Indians, Dog Ribs, and Hare Indians with food, who would be totally unable to inhabit their barren lands were it not for the immense herds of this deer that exist there. Of the horns they form their fish-spears and hooks; and, previously to the introduction of iron by the traders, ice-chisels and various other utensils were made of them. In dressing the skins, the shin-bone, split longitudinally, is used for the purpose of scraping off the hair, after it has been repeatedly moistened and rubbed; the skins are then smeared with the brains of the animal until they acquire a soft, spongy character; and, lastly, are suspended over a fire made of rotten wood until thoroughly impregnated with the smoke. This last-mentioned process imparts a peculiar odor to the leather, and has the effect of preventing its becoming so hard, after being wet, as it would otherwise be. The skins thus dressed are used as winter clothing, and, by sewing sixty or seventy together, will make a covering for a tent sufficient for the residence of a large family. The undressed hide, after the hair is taken off, is cut into thongs of various thickness, which are twisted into deer snares, bow-strings, net-lines, and, in fact, supply all the purposes of rope. The finer thongs are used in the manufacture of fishing nets, or in making snow-shoes, while the tendons of the dorsal muscles are split into fine and excellent sewing thread. In some instances I have seen the skin so finely dressed that it equalled chamois leather.

Every part of the animal is consumed, even to the contents of the stomach—a savory mixture, much esteemed by the Canadian voyageurs after it has undergone a degree of fermentation, or has lain to season, as they term it, for a few days. By collecting the blood, and boiling it, they also form a very rich soup, which is considered a dainty. When all the soft parts are consumed the bones are pounded small, and a large quantity of marrow is extracted from them by boiling, which is used in making the better kinds of the mixture of dried meat and fat termed pemmican; it is employed also by the young men and females for annointing the hair and greasing the face on dress occasions. Pemmican is formed by pouring one-third of melted fat over the meat, which has been previously cut into thin slices, dried in the sun or over the smoke of a slow fire, and pounded between stones, and then incorporating them together. If kept dry, it may be preserved sound for four or five years; and, from the quantity of nourishment it contains in small bulk, it is the best kind of food for those who travel through desert lands.

The caribou travel in herds, varying in number from eight or ten to one hundred thousand; and in the rutting season the bulk of the males and females live separately. Their daily excursions are generally towards the quarter whence the wind blows; and of all the deer of America they are the most easy to approach. The Indians kill them with the gun, take them in snares, or spear them crossing rivers or lakes. The Esquimaux catch them in traps. They are frequently slaughtered in vast numbers; a single family of Indians will sometimes kill many hundreds in a few weeks.

When the Indians design to impound deer, they look out for one of the paths in which a number of them have trodden, and which is ob-

served to be still frequented by them. The pound is built by making a strong fence with bushy trees, without observing any regularity, varying from a few yards to a mile in circumference. The entrance to the pound is about the size of a common gate, and the inside is crowded with hedges, in every opening of which a snare is set, made of thongs of deer skin parchment, well twisted together, which are amazingly strong; one end of the snare is usually made fast to a small growing tree. The pound being thus prepared, a row of small brushwood is stuck up in the snow on each side of the door or entrance, and these hedge rows are continued along the open part of the lake, river, or plain, which, from its openness, makes them the more distinctly observed. The brushwood rows are generally placed at the distance of fifteen or twenty yards from each other, and ranged in such a manner as to form two sides of a long, acute angle, becoming gradually wider in proportion to the distance they extend from the pound, which sometimes is not less than two or three miles; while the deer's path is exactly along the middle, between the two rows of brushwood. From a commanding situation the Indians watch the approach of the deer, when they close in upon them in the form of a crescent. The poor timorous animals, finding themselves pursued, and mistaking the brushwood for ranks of people stationed to prevent their passing on either side, rush on, and entangle themselves in the snares, thus becoming an easy prey to the ingenious hunter. The manœuvre is sometimes so successful that whole families find subsistence without having occasion to remove their tents above once or twice during the whole winter.

Doctor King, from whom, in connexion with Doctor Richardson, we have borrowed most of the preceding remarks, is strongly of opinion that the Barren Ground caribou is capable of domestication as complete as that to which the Laplanders have reduced the European species. Of the vast benefit of such a step, especially in reference to the Indians of the same region, it is difficult to speak in sufficiently moderate terms. The peculiar fondness for pets, and the skill in their domestication, manifested by these Indians, are sufficient evidence of the success with which they might be encouraged to try the experiment on the caribou. Its success would at once place them beyond the reach of those vicissitudes which are so rapidly sweeping off the Indians of the north and northeast of America. Nor would there be any difficulty in subsisting large herds of these deer throughout the year. In summer the rich pastures along Great Fish river, and other streams, would supply countless numbers; while the lichens of the rocks or shrubs would furnish them with food in the winter, with such slight assistance from their owners as the case might demand. In this way these Indians might become a pastoral people, and possibly, in time, as agricultural as the nature of the seasons would admit.

Tarandus Hastalis, Agassiz. *Woodland Caribou.*

In the last article we have indicated the principal difference between the two reindeer. In nothing is this more marked than in the geographical distribution; the one belonging to the Barren Ground, the other to the woods. The latter species is much larger, sometimes weighing

three or four hundred pounds. The horns, although very stout in proportion to their length, are yet decidedly shorter.

As already remarked, the reindeer is still common in the wilderness forming the northern parts of Vermont, New Hampshire, and Maine.

Lieutenant Thom, of the topographical corps, while retracing and surveying part of the Maine boundary line last summer, saw tracks of many individuals while in the country between Lake Memphramagog and Lake ————. They abound in Maine and New Brunswick. Of a size much greater than that of the Barren Ground caribou. The flesh, as an article of food, is far inferior. The rut takes place in October, and the young are produced in June.

The remarks in regard to domestication apply as well to this species as to the one last mentioned; while the value, as a beast of burden, or draught, would probably be much greater, on account of the superior size. There seems to be little doubt that domestication would enable the species to exist further at the north, and even in the Barren Grounds themselves. Indeed, the European reindeer might itself be imported and propagated, and thus the loss of time consequent upon the attempt of domesticating a wild species be avoided. Nothing would be easier than to bring over from Norway or Sweden a drove of reindeer, and stocking one or more of the forts in Hudson's Bay, or other parts of British America.

Tarandus furcifer. *The European Reindeer.*

The Old World reindeer (*Tarandus furcifer*) is found throughout the arctic regions. It abounds in Kamschatka, Siberia, Northern Russia, Sweden, and Norway; but especially in Finmark and Lapland. In Europe its southern limit is the Baltic; in Asia it extends along the Ural to the Caucasus. Its existence in Iceland has been denied; and, indeed, its introduction there seems to date back less than one hundred years. At that time, sixteen animals were imported from Norway, of which only three landed alive. These were turned loose in the mountains, and have multiplied to a very great degree. In some sections of the island they are found in hords of many hundreds. Little or no attempt at their domestication has been made by the inhabitants, as the cow and sheep thrive extremely well, rendering any substitute unnecessary. In Finmark and Lapland, however, where the reindeer is still found wild, the natives use every art in their power to capture and bring them to a state of domestication —an animal which constitutes their sole wealth, and, indeed, the means of their existence, and without which their country would be in reality, as to the stranger it appears, an uninhabitable desert.

The food of the reindeer varies with the season and with the climate. Lapland, says Hoffberg, in the memoir above quoted, is divided into two tracts, called the Alpine and Woodland country. Those immense mountains, called in Sweden Fjellen, divide that country from Norway, extending towards the White Sea as far as Russia, and are frequently more than twelve miles in breadth. The other, called the woodland division, lies to the east of this, and differs from the neighboring provinces of Norway by its soil, which is exceedingly strong and barren, being covered with one continued tract of wood, of old pine trees. This tract

has a very singular appearance. The trees above are covered over with great quantities of a black hanging lichen, growing in filaments resembling locks of hair; while the ground beneath appears like snow, being totally covered with white lichens. Between this wood and the Alps lies a region called the Woodland, or Desert Lapmark, of thirty or forty miles in width, of the most savage and horrid appearance, consisting of scattered uncultivated woods, and continued plains of dry, barren sands, mixed with vast lakes and mountains. When the mosses on part of this desert tract have been burnt, either by lightning or any accidental fire, the barren soil immediately produces the white lichen, which covers the lower parts of the Alps. The reindeer, in summer, seek their highest parts, and there dwell amidst their storms and snows, not to fly the heat of the lower regions, but to avoid the gnat and gad-fly. In winter these intensely cold mountains, whose tops reach high into the atmosphere, can no longer support them, and they are obliged to return to the desert to subsist upon the lichens. Of these its principal food is the reindeer lichen. There are, says Hoffberg, two varieties of this: the first is called *sylvestris*, which is extremely common in the barren deserts of Lapland, and more particularly in its sandy and gravelly fields, which it whitens over like snow; its vast marshes, full of tussocks of turf, and its dry rocks are quite grown over by it. The second variety of this plant, which is less frequent than the former, is named the alpine. This grows to a greater height, with its branches matted together; it has this name, because, when those mountains are cleared of their wood, the whole surface of the earth is covered with it; yet it is seldom to be found on their tops. When the woods become too luxuriant, the Laplander sets fire to them, as experience has taught him that when the vegetables are thus destroyed, the lichen takes root in the barren soil and multiplies with facility; though it requires an interval of eight or ten years before it comes to a proper height. The Laplander esteems himself opulent who has extensive deserts producing this plant exuberantly; when it whitens over his fields, he is under no necessity of gathering in a crop of hay against the approach of winter, as the reindeer eats no dried vegetable, unless perhaps the river horsetail (*Equisetum fluviatile*). They root for this lichen under the snow like swine in a pasture; their fore-heels, nose, and feet are guarded with a hard skin closely attached to those parts, that they may not be hurt by the icy crest which covers the surface of the snow. The very strong shoes which the Laplander esteems so much, are made of these parts of the hide. It sometimes happens (but very rarely) that the winter sets in with great rains, which the frost immediately congeals; the surface of the earth is covered with a coat of ice before the snow falls, and the lichen is entirely encrusted and buried in it; thus the reindeer is sometimes starved, and a famine attacks the Laplanders. In such an exigence they have no other resource but felling old fir-trees grown over with the hairy liverworts. These afford but a very inadequate supply even for a small herd; but the greater part of a large one, in such a case, are sure to perish with hunger. In the summer, when the reindeer ranges upon the Alps, a number of plants afford it food. Hagstrom states that it refuses to eat forty-six species, the names of which he gives.

That the lichen is not absolutely necessary as an article of food, is proved by the length of time during which a female of this species lived

at the Zoological Gardens, London. She survived ten winters, during which her food consisted almost entirely of hay. Her death, too, seemed to have been caused by inflammation of the lungs, rather than by any disorder of the digestive functions.

To the nations among which the reindeer is domesticated—the Laplanders especially—this animal is of the first necessity. According to Hoffberg, the mountaineer very often possesses three or four hundred, and even one thousand; the woodman rarely above one hundred. As a domestic animal, yielding a quantity of most delicious food, and occupying the place of the cow and the ox, it is invaluable; as a beast of draught, its importance is equally great, and its organization is adapted to the long wastes over which it forms the Laplander's sole means of communication: no less than that of the camel, it is framed for those deserts which, without the aid of these animals would be impassable. The weight which the reindeer can draw is about 300 pounds, although 240 forms the usual load. Its speed, when thus employed, is almost incredible. In a race of three deer with light sledges, started by Pictet, who went to the north of Lapland in 1769 to observe the transit of Venus, the first performed about 3,090 feet in two minutes, or nearly 19 English miles to the hour; the second made the same distance in three minutes, and the third in three minutes twenty-six seconds. Journeys of one hundred and fifty miles in nineteen hours are said to be not uncommon; and one animal is affirmed, in 1699, to have drawn an officer, with important despatches, eight hundred miles in forty-eight hours, falling dead at the end.

The tame reindeer, after shedding his coat, is of a brownish-yellow color, becoming gradually whiter, and ultimately almost entirely of this color. The space around the eye is entirely black. The longest hair is under the neck; the mouth, tail, and its vicinity white; and the feet, at the insertion of the hoof, are surrounded with a white ring. The hair of the body is so thick that the skin cannot be seen when the hair is parted; and when cast, it does not come away by the roots, but breaks at the base.

We have thus gone into much detail on the subject of the reindeer, believing it to be one of vital importance to the future progress of Arctic America. Of the capability for domestication of the American species, there can be no question—this, as a general rule, being shared by all gregarious mammalia. The wild European individuals can be caught and tamed with the greatest ease. In this connexion we may remark, that the reindeer forms one of the very few exceptions to the fact, that the domestic species seldom have relatives in a known wild state. This is the case with the horse, the ox, the sheep, the cat, the dog, and others; or, at any rate, in all these instances it is difficult to refer the species to wild ones.

For domestic purposes, the horns of the various species of deer constitute serious impediments to general use. Fortunately, however, it is in our power to have them or not in domesticated species at pleasure, owing to the strong sympathy between the organs of generation and the organs which regulate the development of the horns. In all deer, except, perhaps, the reindeer, if the male be castrated when the horns are in a state of perfection, these will never be shed; if the operation be performed when the head is bare, they will never be reproduced; and if done when the secretion is going on, a stunted, ill-formed, permanent horn is the

result. Castration will, as a general rule, be necessary for the full perfection of deer as food or animals for useful purposes. It is probable, too, that even without emasculation much may be done to regulate the horns; for instance, if the budding antlers be broken, or cut off, while in the velvet, it is highly probable that their reproduction will be materially affected. In the park of Col. Tuley, Clarke county, Virginia, we have seen an elk *(Elaphus canadensis)* which, when young, had one horn broken off. Every successive year this horn was reproduced as a single stub, without any branches whatever; while that on the opposite side presented a magnificent development of tines, giving to the animal a singularly unsystematic appearance. It is not quite certain, or at least authorities differ widely, as to whether the reindeer experiences the same changes in the horns on castration or not. The fact that the female has horns, as well as the male, may indicate some organic difference in the constitution of the genus *Tarandus*.

Alces Americana. *Moose Deer.*

This magnificent deer, the largest of its tribe, like the reindeer, is confined to the colder portions of the northern hemisphere, although between rather more southern parallels. They abound in the northern parts of Maine and New Hampshire, in Labrador, Nova Scotia, New Brunswick, and Canada. A few are still found in New York, west of Lake Champlain, in the counties of Essex, Lewis, Hamilton, &c., especially in the neighborhood of the giant Adirondacks. This region, crowned by Tahawus or Mount Marcy, the most rugged, inaccessible, and magnificent mountain of the north, and but little inferior in height to Mount Washington, is even now in a condition almost as wild as when the white man first penetrated into its recesses. Here the traveller may listen to the shrill scream of the panther and the dismal howl of the wolf, or hunt the moose, the Virginia deer, the bear, and occasionally the elk. Sometimes the moose extends to the very shores of Lake Champlain, one individual having been killed a few years ago near the village of Westport, in Essex county, on this lake. The moose is also found in northern Vermont.

The southern limit of this species along the Atlantic coast is about 43½°; but they are rarely found so low down in the central parts of America. They exist north of 49° across the continent, and are especially numerous in the northern Rocky mountains. In this range they extend to the Arctic sea, having been found at the mouth of Mackenzie's river, in lat. 69°. Farther east they do not exceed the parallel of 65°.

To the inhabitant of Maine, New Brunswick, and Lower Canada, the habits of the moose are well known, as it is a favorite article of the chase, constituting, as it does, the largest tenant of the American forest, its chosen abode. In the account of the moose in the invaluable work of Audubon and Bachman on the Quadrupeds of North America, we find an excellent article from the pen of Mr. Kendall, of Quebec, from which we make the following extract:

"The moose are abundant to the north of Quebec, and in the northern parts of the State of Maine. In the neighborhood of Moose river, and the lakes in its vicinity, they are very abundant. In the summer they are fond of frequenting lakes and rivers, not only to escape the attacks of insects which then molest them, but also to avoid injuring their antlers,

which, during their growth, are very soft, and exquisitively sensitive; and, besides, such situations afford them abundance of food.

"They there feed on the water plants or browse upon the trees fringing the shores. In the winter they retire to the dry mountain ridges, and generally 'yard,' as it is termed, on the side facing the south, where there are abundance of maple and other hard-wood trees upon which to feed, either by browsing on the tender twigs or peeling the bark from the stems of such as are only three or four inches in diameter. Their long pendulous upper lip is admirably adapted for grasping and pulling down the branches, which are held between the fore-legs until all the twigs are eaten. They peel off the bark by placing the hard pad on the roof of the mouth against the tree, and scraping upwards with their sharp, gouge-like teeth, completely denuding the tree to the height of seven or eight feet from the surface of the snow. They remain near the same spot as long as any food can be obtained, seldom breaking fresh snow, but keeping to the same tracks as long as possible.

"The antlers begin to sprout in April, and at first appear like two black knobs. They complete their growth in July, when the skin which covers them peels off, and leaves them perfectly white; exposure to the sun and air, however, soon renders them brown. When we consider the immense size to which some of them grow in such a short period of time, it seems almost incredible that two such enormous excrescences could be deposited from the circulating system alone. The daily growth is distinctly marked on the velvety covering by a light shade carried around them. The first year the antlers are only about one inch long; the second year four or five inches, with perhaps the rudiment of a point; the third year about nine inches, when each divides into a fork, still round in form; the fourth year they become palmated, with a brow-antler and three or four points; the fifth season they have two crown-antlers, and perhaps five points; the points increasing in size each year, and one or two points being added annually until the animal arrives at its greatest vigor; after which period they decrease in size, and the points are not so fully thrown out. The longest pair I ever met with had eighteen points, (others have them with twenty-three points;) they expanded five feet nine inches to the outside of the tips; the breadth of palm eleven inches without the points; circumference of shaft, clear of the burr, nine inches; weight, seventy pounds. The old and vigorous animals invariably shed them in December; some of four or five years old I have known to carry them as late as March; but this is not often the case.

"The rutting season commences in September. The male then become very furious, chasing away the younger and weaker ones. They run bellowing through the forest, and, when two of equal strength meet, have dreadful conflicts, and do not separate until one or both are severely injured. I bought a pair of antlers from a Penobscot Indian, with one of the brow-antlers and the adjoining prong broken short off. The parts were at least an inch and a half in diameter, and nearly as hard as ivory. At that season they are constantly on the move; swimming large lakes and crossing rivers in pursuit of the female. The female brings forth in May. The first time she produces one fawn, but afterwards two. It is supposed by hunters that these twins are always one a male and the other a female.

"In summer the hair of the moose is short and glossy; in winter long and very coarse, attached to the skin by a very fine pellicle, and rendered warm by a thick coat of short fine wool. The hair on the face grows upwards from the nose, gradually turning, and ending in a thick bushy tuft under the jaws. The young males have generally a long pendulous gland growing from the centre of this tuft, and covered with long hair, sometimes a foot long. Their flesh is very coarse, though some people prefer it to any other; it is apt to produce dysentery with persons unaccustomed to use it. The nose, or *mouffe*, as it is generally called, if properly cooked, is a very delicious morsel. The tongue is also considered a delicacy. The last entrail (called by hunters the bum-gut) is covered with round lumps of suety fat, which they strip off and devour as it comes warm from the animal, without any cooking; also, the marrow, warm from the shanks, is spread upon bread and eaten as butter. I must confess that the disgusting luxury was rather *too rich* to tempt me to partake of it. I have seen some officers of the Guards enjoying it well enough.

"The seasons for hunting the moose are March and September. In March, when the sun melts the snow on the surface, and the nights are frosty, a *crust* is formed which greatly impedes the animal's progress, as it has to lift its feet perpendicularly out of the snow or cut the skin from its shanks by coming in contact with the icy surface.

"It would be useless to follow them when the snow is soft, as their great strength enables them to wade through it without any difficulty. If you wish to see them previous to shooting them from their 'yard,' it is necessary to make your approach to leeward, as their sense of smelling and hearing is very acute; the crack of a breaking twig will start them, and they are seldom seen any more until fatigue compels them to knock up; and thus ends the chase. Their pace is a long trot. It is necessary to have two or three small curs, (the smaller the better,) as they can run upon the snow without breaking through the crust; their principal use is to annoy the moose by barking and snapping at their heels, without taking hold. A large dog that would take hold would be instantly trampled to death. The males generally stop, if pressed, and fight with the dogs. This enables the hunter to come up unobserved and despatch them. Sometimes they are killed after a run of an hour; at other times you may run them all day, and have to camp at night without a morsel of provisions or a cloak, as every thing is let go the moment the moose starts, and you are too much fatigued to retrace your steps to procure them. Your only resource is to make a huge fire, and comfort yourself upon the prospect of plenty of moose-meat next day. As soon as the animal finds he is no longer pursued, he lies down; and the next morning he will be too stiff to travel far. Generally, a male, female, and two fawns, are found in a 'yard.'

"When obliged to run, the male goes first, breaking the way, the others treading exactly in his tracks; so that you would think only one had passed. Often they run through other 'yards,' when all join together, still going in Indian file. Sometimes, when meeting with an obstacle they cannot overcome, they are obliged to branch off for some distance and again unite. By connecting the different tracks at the place of separation, you may judge pretty correctly of their number. I have seen twelve together, and killed seven of them."

A method of hunting this animal is as follows: In September, two persons, in a bark canoe, paddle by moonlight along the shore of the lake, imitating the call of the male, which, jealous of the approach of a stranger, answers to the call and rushes down to the combat. The canoe is paddled by the man in the stern with the most death-like silence, gliding along, under the shade of the forest, until within short shooting distance, as it is difficult taking a sure aim by moonlight. The man in the bow generally fires, when, if the animal is only wounded, he makes immediately for the shore, dashing the water about him into foam. He is tracked by his blood the next day to where he has lain down, and where he is generally found unable to proceed any further. Many are killed in this manner in the neighborhood of Moose river every season.

Hunters sometimes find out the beaten tracks of the moose, (generally leading to the water,) and bend down a sapling and attach to it a strong, hempen noose, hanging across the path; while the tree is confined by another cord and a sort of trigger. Should the animal's head pass through the dangling snare, he generally makes a struggle, which disengages the trigger; and the tree, springing upwards, lifts the beast off its legs and strangles it. The palmated horns of the moose are so ponderous, that sixty pounds is a very common weight. To bear this stupendous head dress, nature has endowed the moose with a short and strong neck, which takes from it much of that elegance and symmetry of proportion so generally predominant in deer. It is, nevertheless, a very energetic and imposing animal. It is said neither to gallop nor leap—acquirements rendered unnecessary from the disproportionate height of its legs, by which it is enabled, as it trots along, to step with the greatest ease over a fallen tree, a gate, or a split fence. During its progress, it holds the nose up, so as to lay the horns horizontally back, which attitude exposes it to trip by treading on its fore-heels. Its speed is very great, and it will frequently lead an Indian over a tract of country exceeding three hundred miles before it is secured. This animal is said to possess, in an eminent degree, the qualities of the horse and the ox, combining the fleetness of the former with the strength of the latter. None of the deer are more easily domesticated, the reindeer not even excepted. In Canada they have frequently been trained to draw sleds or carts, although, during the rutting season, they could not be so employed. A gentleman near Houlton, Maine, some years since trained a pair to draw a sleigh, which they did with great steadiness and swiftness; subject, however, to the inconvenience that, when they once took it into their heads to cool themselves in a neighboring river or lake, no efforts could prevent them. The European species or variety, whichever it be, has also been converted to the uses of man. In former times, when it was found in Scandinavia in great abundance, it was used for the purpose of conveying couriers, and has been known to accomplish a distance of two hundred and thirty-four miles in a day, attached to a sleigh. Its speed is even greater than that of the reindeer, which can rarely exceed two hundred miles in a day, although a case is related where, in consequence of a sudden invasion of the Swedish territory by the Norwegians, an officer was despatched from the frontiers of Norway, with a reindeer and sleigh, to Stockholm with the news. This was conveyed with such speed that the distance of eight hundred miles was accomplished in forty-eight hours, the animal falling dead at the expiration of the time. To this anecdote we have already alluded under the

head of the reindeer. A Swedish writer recommends the employment of the moose (or elk of Europe) in time of war, asserting that a single squadron, with its riders, could put to immediate flight a whole regiment of cavalry; or, employed as flying artillery, would, from the extraordinary rapidity of their movements, insure the victory. Indeed, at the time when attention was especially directed towards the domestication of this animal, their use was forbidden, under the heaviest penalties, on account of their having been employed, from their extraordinary speed, to effect the escape of criminals. The European elk, at one time numerous throughout Norway and Sweden, is now confined to particular districts; at the present time it is not found farther north than 64° in Scandinavia. Owing to the danger of total extinction, a law has recently been passed forbidding its destruction in Sweden for ten years from 1857, under severe penalties. The elk is reported to attain not unfrequently a height of seven or eight feet. One individual, only two years old, measured nearly nineteen hands, or more than six feet, in height. Another elk, not fully grown, weighed nearly one thousand pounds. The period of gestation is about nine months, the female producing from one to three young in May. The horns are shed about February.

The skin of this animal has been put to various uses. In Sweden a regiment was clothed with waistcoats made of this material, which was so thick as to resist a musket-ball. When made into breeches, a pair of them, among the peasantry of former days, went as a legacy through several generations.

In respect to the domestication of the moose, the remarks already made in reference to the effect of castration in increasing the size and docility, as well as regulating the horns, of the animal will not be forgotten.

Elaphus Canadensis, Ray. *American Elk.*

The elk of the United States ranks as the second in size of the numerous species belonging to the North American continent. Strikingly similar, in general appearance, to the stag of Europe, (*Elaphus Europæus,*) by the early settlers it was supposed to be the same species; its superior size being a necessary consequence of the more extended range furnished by the boundless forests and prairies of the New World. Hence, the term "stag" occurs with great frequency in the writings of the earliest authors; and, indeed, it is within but a comparatively recent period that the diagnoses of the two species have been accurately settled. For our present purpose it will be sufficient merely to state that the American elk, or wapiti, is at least a foot higher at the shoulders than the common stag, and has all the upper parts and jaw yellowish-brown; the latter being of a uniform blackish-brown, with a black mark on the angle of the mouth, wanting in the elk. The white circle around the eye of the European species is replaced in the American by brown. The proportions of the antlers, also, are different, as well as other features.

An instance of the inconvenience of applying the same name to different objects is well seen in the case of the subject of our present article. The term elk has been given to a European species very closely allied, if not identical, with the moose of the United States, (*Alces*

Americanus.) Hence, it becomes necessary, in meeting with the word elk, to know whether the writer or the animal be American or European.

The American elk, sometimes called wapiti, was once extensively distributed throughout the present limits of the United States. At the present time, in the eastern parts, it is only found in a few counties of Pennsylvania—as Elk and Clearfield—where, indeed, their numbers are decreasing day by day. Occasionally one has been seen in the moose-range of the Adirondacks, in Lewis, Hamilton, and some other counties of northern New York. This has not been the case, however, for more than twenty years. A few are known to exist in the Alleghanies of western Virginia. We next find them in the southern part of Michigan; but it is only as we proceed further west that they present themselves in numbers. In Minnesota they are found in large herds, and in still larger on the Upper Missouri, Yellowstone, and other streams. Of the vast numbers in these regions, some idea may be formed from the piles of shed horns which the Indians are in the habit of heaping up in the prairies. One of these, in Elk Horn prairie, about eighty miles above Fort Union, has for many years been a conspicuous land-mark to the traveller, showing like a white monument many miles off. This, which was torn down in the summer of 1850, was about fifteen feet high, and twenty five in circumference; others still larger are found on the Upper Yellowstone.

The northern range of the elk is given by Sir John Richardson, as the 56th or 57th parallel, and in high latitudes its eastern limit is found in a line drawn from the south end of Lake Winipeg to the Saskatchewan, (lon. 103°,) and thence to Elk river, in the 111th degree. West of this line it extends to the Pacific, and south to Texas, New Mexico, and California. This range is very extensive—much greater than that possessed by any other species; and it is not at all improbable that a careful comparison of specimens will indicate more than one species. Specimens of skulls and horns in the Smithsonian Institution, from several extreme points, vary considerably. One in particular, from the region in British America north of Fort Union, is confidently asserted by the hunters to belong to a different species, known as the little elk, considerably smaller than the more common one.

It may well be expected that in the western plains the elk should attain to its maximum size. Individuals nearly the size of a horse are not unfrequent. In California and New Mexico antlers, it is said, have been found so large as, when resting on their tips, to permit a tall man to walk erect between them.

The elk is an animal easily kept in parks, where we have frequently seen them. They are to be found on many estates in Virginia—among others, on that of Colonel Tuley, in Clarke county. Their size and strength render them dangerous in the rutting season, at which period they are quite unmanageable.

This species is easily domesticated, and can readily be trained to draw in single or double harness. It is, therefore, next to the caribou and moose, the one to which we are most entitled to look for an increase of our stock of domestic animals. The great size of the horns of the male, and his fierceness and uncontrollability during the rutting season, are certainly obstacles in the way of reducing the elk to the rank of a servant to man; nevertheless they are not insurmountable, after all. No

quadruped is more to be dreaded than a wild or irritated buck; yet, by the simple operation of castrating, his temper is subdued, his size greatly increased, and his whole nature entirely changed. The flesh, too, from being unpalatable, and, indeed, almost uneatable, is converted into the crowning dish of the epicure. There is no reason to doubt that the same results will follow in the case of the elk. The inconvenience of the large horns can also be overcome by the same operation; since we have already stated that, if performed when the horns are shed, these will never be reproduced. If the social instinct be a condition to the complete domestication of an animal, no deer possesses it in a higher degree than the elk, which is sometimes found in herds of thousands.

The antlers of the buck elk drop in February or March, and are reproduced in the course of four or five months. It is difficult to believe that the noble antlers of a full-grown individual actually fall off every year, and are reproduced in a short four months; but such is the fact. The males of all the deer, whatever their size, lose their horns annually. The females bring forth in May or June.

Cervus Macrotis, Say. *Mule Deer.*

The black-tail deer is the largest of the true deer, of the restricted genus *Cervus* found in North America. It derives its scientific name, *macrotis*, from the great length of the ears, resembling those of the mule, whence it is sometimes called the mule deer. Its more common appellation, black tail, is owing to the black tip to the tail. In size it is considerably larger than the common Virginia deer.

This species is limited in its range by the Missouri river, east of which it is seldom seen. In ascending this stream it is found on Vermillion river, increasing in number northwards to the Saskatchawan. In the Black hills it is very abundant, as well as in most of the Rocky mountain ranges, even as far south as Texas. It is, however, confined to the eastern side of the mountains, being replaced towards the Pacific by the closely allied *Cervus Richardsonii*.

Cervus Lewisii, Peale. *Black-Tail Deer.*

As already remarked, this species, on the western slopes of the Rocky mountains, replaces the one last named on the eastern. Larger than *Cervus Virginianus*, it is smaller than *C. macrotis*. The hair is finer than in *C. macrotis*, which species has it coarse and spongy, like that of the elk. It has no glandular opening on the outer surface of the hind-leg below the knee-joint; while in *C. macrotis* this opening is as much as six inches in length. The horns are stouter and more covered with sharp points, and the brow antler is wanting. The tail is of the same length as in the Virginia deer, but is jet black above and on the sides, and white beneath. It never runs at full speed, but, like the mule deer, bounds with every foot from the ground at the same time. The flesh is said to be inferior in flavor to that of any other species.

The Pacific black-tail deer is found all along the coast, being exceedingly abundant in California and Oregon.

CERVUS VIRGINIANUS, Pennant. *Common Deer, (Virginia Deer).*

The common deer of the United States is, at the present day, too well known to need a special description. No State in the Union is without individuals of this species. In many sections of the country, as the Alleghanies and Adirondacks, they are exceedingly abundant, and not much less so in many of the southern Atlantic States. Their range extends from Maine to the Gulf of Mexico, and from the Atlantic to the Rocky mountains, beyond which its existence is not substantiated. It varies somewhat in its features over this extensive district, being much larger in the north, and decreasing to the south by almost one-half. Epicures assert that this difference in size is accompanied by a difference in the quality of the fat when cooked and cooled. In the north, the fat on the surface soon cools and congeals, becoming like tallow or mutton suet; whereas in Florida, where it sometimes cuts an inch on the saddle, it remains soft or elastic for some time after being taken from the fire, and is of delicious taste, like the fat of beef. The economical qualities of this deer are of the first order. The excellence of its flesh in the form of venison is well known to every one. The dressed hide, as buckskin, is of the highest importance to the Indian for the construction of various articles of dress, and scarcely less so to the white hunter. The horns are converted into handles for cutlery.

The male deer loses its horns in January, the new set commencing to sprout out after the lapse of a few weeks. These require their full growth by July or August, after which they are in their prime. The rutting season commences in October or November, during which period terrible battles are fought. Not unfrequently, bucks are found with their antlers interlocked inextricably, and dead of starvation.

The young are brought forth in April or May—sometimes later—in the northern States. The average number at a birth is two, three being not uncommon.

The Virginia deer is exceeeingly susceptible of domestication, although, when petted, it is apt to become troublesome. Individuals are frequently kept in parks, where, however, they do not thrive so well as the European fallow deer. Their agility is so great as to render it a matter of serious difficulty to keep them within enclosures.

CERVUS LEUCURUS, Douglas. *Long-Tailed Deer.*

This species, if it be really distinct, is the smallest of all the American deer, presenting in its dimensions a striking contrast to the moose. In general appearance it resembles the Virginia deer; it is, however, smaller, and has a tail of great length, measuring sometimes as much as seventeen inches. It is found abundantly on the Columbia river, but does not appear to cross the Rocky mountains—at least within the territory of the United States.

CAPRA AMERICANA, Blainville. *Rocky-Mountain Goat.*

This beautiful animal is frequently confounded with the big horn, or mountain sheep, from which it differs in many important characters. It is of the size of the domestic sheep, and bears no inconsiderable resemblance to the merino breed in the way in which the fleece hangs down on the sides. The body, neck, and head resemble those of the common goat. The horns are small, awl-shaped, and pointed, and nearly erect, with but a slight curvature backwards. Both horns and hoofs are black. The animal is entirely white, with the exception just named.

The body is covered with long, straight hair, considerably coarser than the wool of the sheep, but softer than that of the common goat. This hair is abundant on the shoulders, neck, back, and thighs; a considerable tuft of it, attached to the chin, forms a beard. There is likewise much of it on the chest and lower part of the throat. The tail is short, and, though clothed with long hair, is almost concealed by that which covers the rump. Under the hair of the body there is a close coat of fine white wool. The hair on the face and legs is short, the fetlocks short and, with the hoofs, perpendicular. The small posterior hoofs do not touch the ground.

To the agriculturist and manufacturer, the mountain goat affords a promise of importance which we may well hope to see realized. No wild species can compare with it in the excellence of its fleece, which, even in its original state, is as fine as that of the celebrated Cashmere goat. Careful management, under domestication, would, no doubt, increase this character to an extraordinary degree. Hence it is not remarkable that attention should have been directed to this species with a view to its cultivation. The Highland Society at one time made an effort to introduce this animal into Scotland, where it was supposed it would thrive. Owing, however, to the inaccessibility of its nature, it was found impossible to obtain specimens. At the present time, such might perhaps be procured through the agency of the American Fur Company, to one of whose posts, Fort Benton, on the Upper Missouri, above the falls, skins are occasionally brought.

A competent wool-grower in Scotland, to whom the subject was referred, reported that "the wool which forms the chief covering of the skin is fully an inch and a half long, and of the finest quality. It is unlike the fleece of the common sheep, which contains a variety of different kinds of wool, suitable to the fabrication of articles very dissimilar in their nature, and requires much care to distribute them in their proper order. The fleece under consideration is wholly fine. That on the fore part of the skin has all the apparent qualities of wool; that on the back part very much resembles cotton. The whole fleece is much mixed with hairs, and on those parts where the hairs are long and pendant there is almost no wool."

The mountain goat inhabits the loftiest peaks of the Rocky mountain range, seldom coming down to the plains. They frequent the steepest precipices, and have much of the habit of the common goat. The species is common on those high lands of the Rocky mountains whence flow the four great rivers—the McKenzie, the Columbia, the Missouri, and the Nelson; each one emptying into a different ocean. Their range is between the parallels of 40° and 64°. The only point within the

United States where they are well known is about Fort Benton, whence we have seen a single hunter's skin. No animal is less known to our naturalists, there being not a single preserved specimen, to the best of our knowledge, in any museum within the United States. Travellers who speak of the mountain goat sometimes refer to the big horn, the female of which has horns much like those of a goat.

ANTILOCAPRA AMERICANA, Ord. *Prong-Horn Antelope.*

The prong-horn antelope is familiar to every hunter on the plains west the Missouri river. From this line it extends to the Pacific ocean, and ranges from northern Mexico to the latitude of 53° on the Saskatchewan. It is also abundant in Minnesota, especially on the plains of Red river. On the Missouri it does not occur south of L'Eau qui Court.

The antelope is highly prized as an article of food. When young, the flesh tastes much like venison, although superior to it in flavor; the old animals, however, are frequently very rank.

This species is found at times in immense numbers, almost realizing the tales of the antelopes of south Africa. Herds of a thousand and more have not unfrequently been seen. They run with great swiftness, and all their motions are characterized by ease and grace.

To the Indians, in the absence of buffalo, the prong-horn antelope is of great importance as an article of food. They are shot with the bow and arrow under cover, but the most usual way of catching them is in pens. These pens are formed of branches of trees arranged in a circle, one side of which is incomplete, and approached by a lane formed of walls of the same material, widening outwards. Into the open extremity of this lane the antelopes are gently urged by the Indians, and thence along into the circle; whereupon the opening is filled up by means of brush, and the work of destruction commenced with arrows and clubs. Although exceedingly nimble, yet such is their stupidity that they will not attempt to leap the barriers which confine them, however slight. The hunter frequently lures them within gun-shot by lying flat on the ground, and elevating from time to time a red silk handkerchief or a cap, by which the curiosity of the animal is excited.

OVIBOS MOSCHATUS, Blainville. *Musk Ox.*

A specimen of the skin of the *ovibos moschatus*, or musk ox, sent to England by Hearne, the celebrated traveller, gave Pennant the opportunity of describing and systematically arranging it; which M. Blainville has placed, as its Latin name implies, in a genus intermediate between the sheep and the ox. A slight information of it had been previously obtained through the medium of M. Jeremie, who has the credit of having first brought it into public notice by the produce of some stockings made from its wool, which were said to be even far more beautiful in appearance than silk. By its dense woolly coat, it is effectually protected from the severest weather; and the shortness of its legs renders it admirably suited to the barren grounds, of which it forms one of the characteristic inhabitants.

By the term "barren," the traders designate the northeastern corner

of the American continent, of which the extreme point is Melville Peninsula. These lands have received that appellation on account of being destitute of wood, except on the banks of some of the larger rivers that traverse them. From this circumstance, the traders have not formed there any settlements. The district is generally featured with primitive rocks, consisting of an assemblage of low hills, with rounded summits, more or less precipitous, and separated by narrow valleys. An imperfect peat-earth, covering the lower grounds, nourishes a few stunted willows, glandular dwarf birches, black spruce-trees, or larches; but the soil more generally consists of minute debris of rocks, forming a dry, coarse, quartzose sand, unfit for supporting anything but lichens. In all the larger valleys, lakes of transparent waters are met with, containing fish; some of these are perfectly land-locked, but the greater number are connected by a rapid and turbulent stream, and thus they flow outwards to the sea.

In these barren and desolate parts of the earth, the musk ox remains both winter and summer, contented and happy; feeding, like the caribou, on grass at one season, and on lichens at another; either climbing the most precipitous situations, with all the agility and precision of the chamois, or mountain goat, or seeking the valleys—either in search of more luxuriant food, or shelter from the raging winds.

When fat, their flesh is palatable enough, and, although of a coarse grain, resembles the caribou; but when in a lean state, it is rendered far inferior to that of any other ruminating animal in North America, owing to its being tainted with a strong flavor of musk, which is more particularly the case with bulls. Although it exceeds the weight of the caribou by two-thirds, the hoofs of the musk-ox are so similar to those of the former animal in form, that it requires the experience of a practised hunter to distinguish the difference; those of the musk-ox are, however, rather larger and narrower.

These animals assemble in smaller herds than the other quadrupeds of the north, seldom more than twenty or thirty being seen at one time; from which circumstance, together with the rocky situation they are in the habit of frequenting, it is the most easy matter to approach them; and if the hunter has only the precaution to keep himself concealed, he may destroy, one after another, the whole herd. Instead of betaking themselves to flight, they crowd closer and closer together, as their companions fall around them; which has been attributed to their mistaking the report of the gun for thunder, as, notwithstanding the shortness of their legs, they can run extremely fast. Should they, however, discover their enemies by sight, or by their sense of smell, which is extremely acute, the cows immediately have recourse to flight; while the bulls, being of a more irascible nature, attack the hunter, whose life is placed in great jeopardy, unless he possesses both activity and presence of mind.

The musk-ox inhabits the hilly, barren grounds between the Welcome and Copper mountains, from the 63d or 64th parallel to the Arctic sea, and west towards Parry's islands, or as far as civilized man has penetrated. How much farther they proceed, it is, of course, at present impossible to say. They travel from place to place in search of pasture, but do not penetrate deep into the wooded districts, and are able to procure food in winter on the steep sides of hills, which are laid bare by

the winds, and up which they climb with an agility which their massive aspect would seem to render impossible. In size they are nearly equal to the smallest Highland cattle, but they are more compactly made, and the shaggy hair of their flanks almost touches the ground. In structure they differ from the domestic ox in the shortness and strength of the bones of the neck and the length of the dorsal processes which support the ponderous head. The swelling bases of the horns spread over the forehead of both sexes—in the males coming nearly in contact. The animal is destitute of a tail.

It is not probable that the musk-ox could stand the warmth of the climate of the United States, although the experiment would be well worth trying. The hair is very long and silky, and has been occasionally worked into articles of dress. Could it be obtained in sufficient quantity, there is no doubt of its being of exceedingly great value in the arts. Unfortunately, this species, like the barren-ground reindeer, does not occur within the limits of the United States, and the experiment of domestication, as well as of economical application in general, must be tried, if at all, by the Hudson's Bay Company. To the best of our knowledge, there is not a single specimen of the musk-ox in any museum of the United States; probably not even a portion of the skin or bone.

Ovis Montana, Desm. *Big-horn, (Mountain Sheep).*

This interesting animal, the largest of its kind, is extensively distributed through North America, along the highlands of the Rocky mountains, from California to the parallel of 68°. Unlike the goat, it is not restricted to the inaccessible portions of this range, but comes down to the Black hills, and even along the hills of the upper Missouri. The *mauvaises terres* of the Missouri valley, so remarkable for their rich treasures of vertebrate fossils, are likewise frequented by the big-horn. In all these localities the most perpendicular cliffs are selected, among which they move with the greatest fearlessness. The hunters say that this animal will voluntarily leap from a height sometimes as great as fifty feet, and, falling head-foremost on the elastic tips of the spiral horns, experience no injury whatever from the descent. The horns of the males have, at any rate, a battered appearance at their tips, as if subjected to some such action.

The flesh of the big-horn is excellent when in season, resembling the finest mutton, and even exceeding it in flavor. There seems to be no reason why the animal may not, at some future day, be of much importance for food; as the scantiest vegetation is sufficient to support it, and the difficulties in the way of domestication are not greater than must have been the case with the common sheep. Unfortunately, the hair is too coarse and brittle ever to be of any use in the arts. Much resembling that of the elk, it is considerably coarser in quality.

The big-horn is much larger than the common sheep, the male weighing three hundred and fifty pounds and upwards. The horns of the male are of enormous size, measuring three feet around the spiral. The tips are about eighteen inches apart. The female has horns somewhat like those of the goat, although less pointed; whence it has not unfrequently been considered as the Rocky mountain goat, and as such reported by travellers.

BISON AMERICANUS, Cm. *Buffalo.*

This, the most gigantic of the indigenous mammalia of America, once overspread the entire northern half of the continent. At the time of the discovery by the Spaniards, an inhabitant even down to the shores of the Atlantic, it has been beaten back by the westward march of civilization, until, at the present day, it is only after passing the giant Missouri and the head-waters of the Mississippi that we find the American bison or buffalo. Many causes have combined to drive them away from their old haunts: the wholesale and indiscriminate slaughter by the whites, the extension of settlements, and the changes of the face of the country; but, above all, that mysterious dread of the white man, which pervades animal life in general as a congenital instinct.

Still, it would appear that the buffalo was originally confined within certain limits, which, perhaps, varied from time to time, as they certainly have done within comparatively a recent period. We have already referred to the fact of their existence on the Atlantic coast; how far north they extended is not exactly known. Their existence in Pennsylvania, however, is substantiated by the occurrence of bones of this species in alluvial deposits of rivers, bogs, and caves. At the first settlement of Canada they were not known there. As to their southern range, Lawson speaks of their being found on Cape Fear river, in North Carolina. Theuet, in the very rare work entitled "Les Singularitez de la France antarctique," Paris, 1557, gives, (p. 147,) in a representation of a curious beast of West Florida, a readily recognisable figure of the buffalo. In the Hudson Bay country they did not pass east of the latitude of Red river; south they were found throughout the Mississippi valley, the south Atlantic States, Texas, and Mexico. Their western range was strictly limited to the Rocky mountains, none extending beyond.

At the present time none are found in the Atlantic States, nor even east of the Missouri, except in Minnesota, in the region of the upper Mississippi, and the prairies of the Red river of the north. Their main range, however, is between the Missouri and the Rocky mountains, from Texas and New Mexico to the Saskatchewan, and even as far north as Great Martin lake, lat. 64°. Of late years they have found their way through the Rocky mountains to the plains of the Columbia by the great middle pass, and north of this on the head-waters of the Saskatchewan.

Imagination can scarcely realize the numbers of buffalo which, even now, are found on the western plains. It is not uncommon to see the prairies covered with them as far as the eye can reach; and travellers have passed through them for days and days in succession, with scarcely any apparent dimension in the mass. The paths worn in the plains resemble more the beaten highways of civilization than the mere aggregation of individual hoof-marks. As their routes are, in most cases, selected with the unerring instinct of animal existence, extending in a straight line from one convenient crossing-place of river or ravine to another, and taking the most available springs or streams in their course, they well justify the remark of Mr. Benton as to their agency in defining the high-roads of travel across the prairies, for which they frequently serve almost without an alteration.

Still, vast as these herds are, their numbers are much less than in

earlier times, and they are diminishing with fearful rapidity. Every year sees more or less change in this respect, as well as alterations of their great line of travel. To the Indian, dependent for the very necessaries of life upon the buffalo, these facts come home with stern reality. His existence is bound up inseparably with that of the race of buffalo, and every consideration of humanity to the one prompts a care over the other.

If it were possible to enforce game-laws, or any other laws on the prairies, it would be well to attach the most stringent penalties against the barbarous practice of killing buffalo merely for the sport, or perhaps for the sake of the tongue alone. Thousands are killed every year in this way. After all, however, it is, perhaps, the Indian himself who commits the mischief most wantonly. A frequent mode of hunting the buffalo by them consists in making a "surround." This is done by enclosing a large herd and driving them over a precipice upon the rocks, or into one of the profound ravines which intersect the prairies in various directions. In this way thousands are sometimes killed in a single day. Fires in prairies, too, do their share in the work of destruction, either by their immediate agency or by driving the maddened animals into the ravines just referred to.

Mr. Picotte, an experienced partner of the American Fur Company, estimated the number of buffalo robes sent to St. Louis in 1850 at 100,000. Supposing each of the 60,000 Indians on the Missouri to use ten robes for his wearing apparel every year, besides those for new lodges and other purposes, by the calculation of Mr. Picotte we shall have an aggregate of 400,000 robes. We may suppose 100,000 as the number killed wantonly, or destroyed by fire or other causualties, and we will have the grand total of half a million of buffalo destroyed every year. This, too, does not include the numbers slaughtered on Red river, and other gathering points.

It is, perhaps, unnecessary to state that the American bison is not found in the Old World. A European species of the same genus, *bos*, and closely allied, is the *bos urus*, auerochs of Germany, urus of Cæsar, bonossus of Aristotle, and bison of Pausanius and Pliny. This species, once of rather wide range, is now confined to the country between the Caspian and the Black sea, where it is protected from injury by the severest legislative enactments. Other species are found in various other parts of the world.

The skins of the American buffalo are dressed as follows: After being taken off the animal, they are hung on a post, and the adhering flesh taken off with a bone, toothed something like a saw. This is performed by scraping the skin downward, requiring much labor. The hide is then stretched on the ground, and fastened down with pegs; it is then allowed to remain a day or two, or till dry. After this, the flesh side is pared down with the blade of a knife fastened in a bone, called a grate, which renders the skin even, and takes off about a quarter of its thickness. The hair is taken off with the same instrument; and these operations being performed, and the skin reduced to a proper thickness, it is covered over either with brains, liver, or grease, and left for a night. The next day the skin is rubbed and scraped, either in the sun or by a fire, until the greasy matter has been worked into it, and it is nearly dry; a cord is then fastened to two poles, and over this the skin is thrown, and pulled,

rubbed, and worked till quite dry. After this, it is sewed together around the edges, excepting at one end. A smoke is made with rotten wood, in a hole dug in the earth, and the skin is suspended over it on sticks set up like a tripod, and thoroughly smoked; which completes the tanning, and renders it capable of bearing wet without losing its softness or pliability afterwards.

Buffalo robes are dressed in the same manner, excepting that the hair is not removed, and they are not smoked. They are generally divided into two parts; a strip is taken from each half on the back of the skin where the hump was, and the two halves, or sides, are sewed together, after they are dressed, with thread made of the sinews of the animal, and then the robe is ready for market.

One of the most useful applications of buffalo meat consists in the preparation of pemmican—an article of food of the greatest importance, from its portability and nutricious qualities. This is prepared by cutting the lean meat into thin slices, exposing it to the heat of the sun or fire, and, when dry, pounding it to a powder. It is then mixed with an equal weight of buffalo suet, and stuffed into bladders. Sometimes venison is used instead of buffalo beef. Sir John Richardson, while preparing for his recent Arctic expedition, found it necessary to carry with him pemmican from England. This he prepared by taking a round or buttock of beef, cut into thin steaks, from which the fat and membraneous parts were pared away, and dried in a kiln until the fibre of the meat became friable. It was then ground in a malt-mill, and mixed with nearly an equal weight of beef suet, or lard. This completed the preparation of the plain pemmican; but to a portion raisins were added, and another portion was sweetened with sugar. These latter changes were subsequently highly approved by the voyageurs. The pemmican was then placed in tin canisters, and well rammed down; and after the cooling and contraction of the mass, these were filled with melted lard through a small hole left in the end, which was then covered with a piece of tin, and soldered up. The total amount of beef used by Sir John Richardson amounted to 35,651 pounds; of lard, to 7,549 pounds; of currants, to 1,008 pounds; of sugar, to 280 pounds. These materials constituted 17,424 pounds of pemmican, costing at the rate of 1 shilling $7\frac{1}{2}$ pence (36 cents) per pound.

The meat biscuit of Mr. Borden, now manufactured from beef by him at Galveston in large quantities, is also of much economical importance.

We conclude our article, already extended to unreasonable length, by presenting an account of some domesticated buffaloes, which, better than any language of our own, will present the question of domestication in a proper light. It is taken from Audubon and Bachman's Quadrupeds, as furnished these gentlemen by Robert Wickliffe, Esq., of Lexington, Ky., who has tried the experiment fully.

"The herd of buffalo I now possess have descended from one or two cows that I purchased from a man who brought them from the country called the upper Missouri. I have had them for about thirty years; but from giving them away, and the occasional killing of them by mischievous persons, as well as other causes, my whole stock at this time does not exceed ten or twelve. I have sometimes confined them in separate parks from other cattle, but generally they herd and feed with my stock of farm cattle. They graze in company with them as gently as the

others. The buffalo cows, I think, go with young about the same time the common cow does, and produce once a year. None of mine have ever had more than one at a birth. The approach of the sexes is similar to that of the common bull and cow, under all circumstances, at all times, when the cow is in heat—a period which seems, as with the common cow, confined to neither day nor night, nor any particular season; and the cows bring forth their young, of course, at different times and seasons of the year, the same as our domestic cattle. I do not find my buffaloes more furious or wild than the common cattle of the same age that graze with them.

"Although the buffalo, like the domestic cow, brings forth its young at different seasons of the year, this I attribute to the effect of domestication, as it is different with all animals in a state of nature. I have always heard their time for calving in our latitude was from March until July; and it is very obviously the season which nature assigns for the increase of both races, as most of my calves were from the buffaloes and common cows at this season. On getting possession of the tame buffalo, I endeavored to cross them as much as I could with my common cows, to which experiment I found the tame or common bull unwilling to accede; and he was always shy of a buffalo cow, but the buffalo bull was willing to breed with the common cow.

"From the common cow I have several half-breeds, one of which was a heifer. This I put with a domestic bull, and it produced a bull calf. This I castrated, and it made a very fine steer, and when killed produced very fine beef. I bred from this same heifer several calves, and then, that the experiment might be perfect, I put one of them to the buffalo bull, and she brought me a bull-calf, which I raised to be a very fine, large animal—perhaps the only one to be met with in the world of this blood, viz: a three-quarter, half-quarter, and half-quarter of common blood. After making these experiments, I have left them to propagate their blood themselves, so that I have only had a few half-breeds, and they always prove the same, even by a buffalo bull. The full-blood is not as large as the improved stock, but as large as the ordinary stock of the country. The crossed or half-blood are larger than either the buffalo or common cow. The hump, brisket, ribs, and tongue of the full and half blooded are preferable to those of the common beef; but the round and other parts are much inferior. The udder or bag of the buffalo is smaller than that of the common cow; but I have allowed the calves of both to run with their dams upon the same pasture, and those of the buffalo were always the fattest; and old hunters have told me that, when a young buffalo calf is taken, it requires the milk of two common cows to raise it. Of this I have no doubt, having received the same information from hunters of the greatest veracity. The bag or udder of the half-breed is larger than that of the full-blooded animals, and they would, I have no doubt, make good milkers.

"The wool of the wild buffalo grows on their descendants when domesticated, but I think they have less wool than their progenitors. The domesticated buffalo still retains the grunt of the wild animal, and is incapable of making any other noise, and they still observe the habit of having select places within their feeding-grounds to wallow in

"The buffalo has a much deeper shoulder than the tame ox, but is lighter behind. He walks more actively than the latter, and I think has

more strength than a common ox of the same weight. I have broken them to the yoke, and found them capable of making excellent oxen; and for drawing wagons, carts, or other heavily-laden vehicles, on long journeys, they would, I think, be greatly preferable to the common ox. I have as yet had no opportunity of testing the longevity of the buffalo, as all mine that have died did so from accident, or were killed because they became aged. I have some cows that are nearly twenty years old, that are healthy and vigorous, and one of them has now a sucking calf. The young buffalo calf is of a sandy-red or rufous color, and commences changing to a dark brown at about six months old, which last color it always retains. The mixed breeds are of various colors. I have had them striped with black on a gray ground, like the zebra; some of them brindled red; some pure red, with white faces; and others red, without any markings of white. The mixed bloods have not only produced in my stock from the tame and buffalo bull, but I have seen the half-bloods reproducing, viz: those that were the product of the common cow and wild buffalo bull. I was informed that, at the first settlement of the country, cows that were considered the best for milking were from the half-blood down to the quarter, and even eighth, of the buffalo blood. But my experiments have not satisfied me that the half buffalo bull will produce again. That the half-breed heifer will be productive from either race, as I have before stated, I have tested beyond the possibility of doubt.

"The domesticated buffalo retains the same haughty bearing that distinguishes him in his natural state. He will, however, feed or fatten on whatever suits the tame cow, and requires about the same amount of food. I have never milked either the full blood or mixed breed, but have no doubt they might be made good milkers, although their bags or udders are less than those of the common cow; yet, from the strength of the calf, the dam must yield as much, or even more, milk than the common cow."

V.

AGRICULTURAL CIRCULAR AND REPLIES.

AGRICULTURAL CIRCULAR.

UNITED STATES PATENT OFFICE,
Washington, August, 1851.

SIR: It being the duty of the undersigned annually to collect information on the various branches of agriculture, you are addressed with the view of eliciting such information on this most important national interest as may be useful to embody in the Report for the present year. The questions are intended rather as hints or suggestions, than to be literally followed in shaping replies. Extending, as they do, over the agricultural products of the whole country, no one person can be expected to reply to all, but to such only as relate to subjects with which he is practically familiar.

The United States Census will furnish reliable data as to the quantity of grain and other crops, the number of domestic animals, &c.; so that such questions are omitted in this Circular. But it is desired to obtain the experience of practical men in whatever relates to the cultivation of the staple crops, together with suggestions as to new processes of culture; the introduction of new varieties of grains, seeds, and plants; the improvements in machines and implements of husbandry; and all like topics of universal interest to the agriculturist.

The wide circulation given to the Patent Office Reports renders it especially desirable that all new facts and discoveries of *real practical value*, relating to American husbandry, be embodied therein in a permanent form for the use of the public; and it is confidently hoped that the efforts of this Bureau to collect such information will be readily seconded by the agricultural community.

All communications will be duly acknowledged in the Report.

Very respectfully,
THOMAS EWBANK,
Commissioner.

Information is respectfully solicited on the following and other points belonging to rural affairs:

Wheat.—Is guano used in the production of this crop? And, if so, what is the gain in bushels per 100 pounds of the manure? What the average product per acre—time of seeding and of harvesting—preparation

f seed, and quantity used per acre—how many times and how deep do ou plough—is the yield per acre increasing or diminishing—your sys- em of rotation in crops—best remedies for Hessian flies and weevils—verage price at your nearest market in 1851?

Corn.—Is guano used in the production of this crop? If so, in what way is it applied? What is the gain in bushels per 100 pounds of guano? State the average product per acre—cost of production per bushel—state the best system of culture—best method of feeding, whether whole or ground, cooked or raw. State, if you can, how much grain the manure formed by 10 bushels of corn consumed by hogs will add to an acre, if carefully saved and skilfully applied, at or before the time of planting.

Oats, Barley, Rye, Peas, and Beans.—Average yield of these several crops per acre—quantity of seed used—which crop least exhausting to land—are peas cultivated as a renovating crop; and, if so, with what success?

Clover and Grasses.—Quantity of hay cut per acre—best fertilizers for meadows and pastures—the grass seeds preferred in laying down meadows—quantity sown per acre—cost of growing hay per ton.

Dairy Husbandry.—Average yearly produce of butter or cheese per cow—comparative cost per pound of making butter and cheese—treatment of milk and cream—mode of churning—of putting down butter for market—average price of butter and of cheese.

Neat Cattle.—Cost of rearing till 3 years old—usual price at that age—value of good dairy cows in spring and in fall—how many pounds of beef will 100 pounds of corn produce—will a given amount of food yield more meat in a Durham, Devon, or Hereford, than in a native animal? How do you break steers to the yoke?

Horses and Mules. Is the growing of these animals profitable? What is the expense of rearing a colt or mule until 3 years old? How should brood mares and colts be treated? What is the best way to break young horses and mules for service?

Sheep and Wool.—Is wool-growing profitable—cost per pound of growing coarse or fine wool—how many pounds of wool will a ton of hay produce—are large or small sheep more profitable either for mutton or for their fleeces—how much more does it cost to produce a pound of fine merino than of ordinary coarse wool? The proportion of lambs annually reared to the number of ewes?

Hogs.—What the best breeds—the cheapest method of producing pork and bacon—how many pounds of meat will 100 pounds of corn yield? The best method of putting up pork and curing bacon and hams.

Cotton.—Average yield of clean cotton per acre—cost of production per pound—what crops best grown in rotation with cotton—best preventives against rust, army and boll worms—how deep do you usually plough for this crop—have you any experience in subsoiling or deep tillage for cotton—your experience in the use of cotton seed as a fertilizer—how can cotton lands best be improved without resting them. Is guano used; and, if so, with what result?

Sugar-cane.—Is the cane losing its vital force, and becoming more subject to premature decay than formerly—should not the seeds, in place of rattoons, be occasionally planted to produce new and healthier varieties—can you suggest any improvement in cultivation of the cane, or the

manufacture of sugar—cost of producing sugar per pound. Is guano used—and, if so, with what result?

Rice.—Can rice be successfully cultivated on upland—do you know of any varieties, decidedly superior to others, which deserve increased attention—can you suggest any improvement in the management of rice plantations—quantity grown per acre.

Tobacco.—Average yield per acre—cost of production per hundred weight or hogshead—describe any new process of cultivation or curing—crops best grown in rotation to maintain the fertility of tobacco land. Is guano used, and with what result?

Hemp.—Is the culture of hemp on the increase or decrease? Describe any new process of culture or preparation for market—average yield per acre—cost of production per pound.

Root Crops, (turnips, carrots, beets, &c.)—Is the cultivation of these roots, as a field crop, on the increase? Can you suggest any improvement in preparing land, seeding, after tillage and feeding? Average product per acre.

Potatoes, (Irish and sweet.)—Average yield per acre—cost of production per bushel—most prolific and profitable varieties—best system of planting, tillage, and manuring.

Fruit Culture.—Is the culture of fruit receiving increased attention—cannot apples enough be grown on an acre to render the crop a very profitable one to the farmer—comparative value of apples and potatoes for feeding hogs and cattle—what varieties best to keep for winter use and for exportation—do you know any preventive or remedy for the "blight" on pear and apple trees, or the "yellows" on peach trees? The best method of transplanting, budding, grafting, &c. Make any suggestions on the culture of *grapes* and other fruit—the manufacture of *wine*, and on *forest culture.*

Manures.—What is regarded as the best plan of making and preserving manures from waste—are *lime* and *plaster* used as fertilizers; if so, in what quantity, and how often applied? Is *guano* used, and with what success? Quantity usually applied per acre.

Meteorology.—Time and degree of highest and lowest range of thermometer—mean temperature of each month and of the year—fall of rain in each month, and aggregate for the year.

Note.—Please forward replies as early as convenient—if possible, before the 1st of January—giving the name, post office, county, and State.

REPLIES TO CIRCULAR.

MAINE.

PERRY, WASHINGTON COUNTY, MAINE,
December 20, 1851.

SIR:—I will attempt an answer to a *few* of the inquiries of your Circular.

My residence, as you will see by the heading, is in the extreme "down-east," upon a branch of the Bay of Fundy—exposed to the fogs

and damps of that bay, which moderate in some degree the climate, both in winter and summer—the thermometer showing not so great a range as in situations a few miles inland. My answers will have reference only to my own, and similar situations in this extreme east of the Union. The *pine tree* being as yet the principal crop, there is not much data for information on agricultural topics; yet we hope a better day is dawning.

Wheat can be cultivated here, and is a profitable crop. Guano has been used very little, and not with marked success; fifteen bushels is about the average yield, though forty have been raised per acre. Summer wheat is the only kind raised. A few experiments with winter wheat show that it will do well. "Time of seeding," April 10 to May 10; of harvesting, September 10 to September 20. The best "preparation of seed" known here is a strong brine to float out all light wheat, &c.; then dry with quick lime. Our "system of rotation in crops," where any system is practised, is pasture, oats, turnips or potatoes, wheat or barley, hay, pasture—a six years' course.

Corn is a very uncertain crop here. This year it did not get even to green corn for boiling.

Oats, Barley, Rye, Peas, and Beans.—These we can raise to good advantage. Average yield of oats on green sward, fifty bushels; of barley, twenty-five bushels; rye, fifteen bushels. Barley or wheat is used to lay down land to grass with. The grass-seed takes much better than with oats or rye.

Clover and Grasses.—Quantity of hay per acre where land is in good condition, this year, from two to four tons.

Best Fertilizers.—Bone dust, hog manure; grass seeds used here, timothy, eight quarts; clover, ten pounds; fowl meadow, eight quarts. Cost of growing hay, including rent of land, taxes, and labor, $5 per ton.

Dairy.—Not much cheese made—none for market; average product of butter per cow, one hundred and twenty pounds. "Mode of putting down butter for market:" the best butter is made from sweet cream; let the milk stand from 36 to 48 hours; skim and churn; work out *all* the butter-milk, and the butter cannot fail to be good; and with one-and-a-half ounce of salt and a tea-spoonful of loaf sugar to the pound of butter, packed in spruce firkins, it will be as sweet in a year as on the day it is packed. The price of good butter here is twenty cents. As the rearing and managing of neat cattle is pursued without any system, answers to your question here would be mostly guess work. They must cost about twenty dollars per head, which is about what they sell for at three years old. Good dairy cows are worth twenty dollars in the fall, thirty dollars in the spring.

Horses and Mules.—No mules in the county. The rearing of horses is profitable if we rear fine animals, which will sell at a high price; not otherwise. There are very few raised, and no system pursued; and I must remark the same of sheep. Every farmer keeps a few; but, being fed with other stock from a common mow, no account can be given of the cost of keeping. I am well satisfied that the common coarse-wool sheep, such as are usually kept here, yielding three to four pounds of wool, will not pay the expense of keeping. The merino are as easily kept, are as hardy, yield as much wool per head, and raise as many lambs, on an average, as the coarse-wool sheep. But our winters are too

long to have wool-growing or stock-raising made a profitable business, without some better system than we now have.

Root Crops.—Their cultivation is on the increase since the potato has failed; they are very much taking its place. Beef can be fattened and hogs kept very well with ruta-baga or carrots. The fly, or rather a small *bug*, has become very troublesome to the ruta-baga of late. The best remedy known here is to sow very thick—say four or five pounds of seed to the acre, and as much of the flat turnip-seed sown broadcast. The *bug* is said to prefer the flat turnip to the ruta-baga; and by thus furnishing him an abundance of food, enough will escape him to give a crop. I "can suggest" no "improvement" in preparing land, &c., on the modes practised by *good farmers*, viz: land ploughed deep, worked fine, well manured. In after culture I thin, to ten inches apart, the plants as soon as they get too large for the fly, or as soon as the second leaves are well formed; then use the cultivator and hoe freely. I have succeeded well with guano mixed with plaster, half and half in bulk. Five hundred pounds of guano to the acre give a crop equal to the best farm-yard compost. Our crops range from four to ten hundred bushels per acre, and cost from four to ten cents a bushel. In feeding, I have given up cooking them. I winter my swine *well* on ruta-baga, given raw and whole, from one-half to three-fourths of a bushel daily to each hog. They eat them well, and thrive well on them, much better (I think) than on boiled ones. I fatten my beef in the same way, feeding from one to two bushels per head daily, (or as much as they will eat.)

Potatoes, formerly our *great* and almost *only* crop, have become so uncertain by the disease that no reliable data can be procured. This year the crop was small, but of good quality; the yield, one hundred and fifty bushels per acre, half of which were merchantable, and sold for eighty cents per bushel; cost of production, twenty-five cents per bushel. Our "most prolific and profitable variety," and the only variety raised to any great extent, is the "*white blue-nose*." "The best system of planting," &c., which I have found is, plough, spread the manure, harrow, plough again, dropping the seed in every third furrow; leave them thus till the potatoes begin to break ground; then harrow crosswise the furrows. In this way I have raised 500 bushels white blue-noses to the acre.

Fruit Culture.—The culture of fruit is receiving increased attention, and I know of no crop that will yield a better income to the farmer. There has been, and still is, a great want of faith in the capacity of the soil or climate to bring fruit to maturity. This should not be so. We can raise many varieties of apples to perfection. Plums flourish well here, and pears also, wherever they have been tried. We don't yet begin to talk about the value of apples for swine, or think about exportation; and the culture is not far enough advanced to decide what are best varieties; almost any variety raised here will keep well. I think the best method of grafting, so far as I have had any experience, is, to take up the young tree (at a year old from the seed) in April, or as early as the frost will allow; cut it off at the root with a sloping cut, entering the knife at one inch below the line of the ground, and passing it out at half an inch or an inch above this line; select a scion as nearly the size of the stock as possible, and cut with a slope to match that of the stock; place the parts together, matching the barks accurately on *one* side, let the other come as it may; tie with woollen yarn or cotton wicking, (any-

thing which is soft and will rot off quick,) and transplant immediately, covering the splice with earth. Use no wax, or composition of any kind; it prevents the thread from rotting off and girdles the tree. The advantages of this mode are, its simplicity, certainty, cheapness, and economy of time, as it may be performed in-doors in stormy weather, being careful not to let the roots dry; and if some fail to take, (very few will do so,) the loss is a mere trifle. They grow very thriftily from two to four feet. I have succeeded well in grafting the plum, by cutting down the stock, near the ground, and inserting the scion by cleft-grafting, covering with grafting-wax. This must be done very early, before the sap begins to move. Pear scions will take in the mountain ash and in the wild pear, (shad bush.) I don't know what kind of trees they will make.

"Best plan of making and preserving *manure* from waste" is the barn cellar, well supplied with *dry* muck to absorb the liquid. Lime produces no effect, or plaster applied alone to the land. This has been my experience, and that of others who have tried it. Plaster with guano seems to increase its power and prolong its action. Guano is used by very few farmers, and by them with various success. My own experience is, that it is better than any other manure that I can apply at the same cost, Quantity usually applied—three to four hundred pounds per acre. Lowest range of thermometer, 10° below zero February 8; 12° below, January 31; highest, 84°, September 6 and 8.

RANGE OF THERMOMETER.

Date.	Highest.	Lowest.	Average.	Remarks.
1850.				
December..	38°	–	20°.6	Two feet of snow.
1851.				
Jan. 7.....	42°	12°	19°.3	Two feet of snow; 3 inches of rain.
Feb. 7....	44°	10°	24°.4	Snow six days; rain three days; quantity not noted.
March....	48°	–	29°.1	Nine days snowy; 2 inches of rain; fields covered with snow, and good sleighing till 30th; 2 feet snow in the woods.
April.....	57°	23°	38°.55	Nine rainy days; 7 inches.
May.....	71°	31°	46°	Eleven frosty nights; eight rainy days; 9 inches.
June.....	74°	37°	53°.3	Six rainy days; 4½ inches; one frosty night.
July.....	80°	44°	59°.3	Eleven rainy days; 8.5 inches.
August....	80°	47°	60°.33	Twenty-seven fair days; two rainy days; 3 inches.
September.	84°	34°	56°.4	2½ inches rain; frost 15th and 16th.
October....	70°	30°	49°.7	13 inches; eleven rainy days; ice 17th.
November.	54°	16°	33°.7	Rain three days; 4 inches; snow five days; 10 inches.

Winter set in, that is, the ground froze, and sleighing, which continues till this time, commenced on the 10th day of November.

From the time sleighing broke up in the spring till it commenced again in the fall, 7 months 11 days .

All which is respectfully submitted by

WM. D. DANA.

THOMAS EWBANK, Esq.

NORRIDGEWOCK, SOMERSET COUNTY, MAINE,
December 20, 1850.

SIR: In reply to the Circular of queries which I received from the Patent Office in September last, desiring information relative to the agricultural products, and other topics, in this vicinity, I will endeavor to give such information as can be obtained from sources to be relied upon.

Wheat.—The kinds most used here for spring sowing are a bald white chaff, called tea wheat, and a bearded red chaff, known as Malaga wheat. But a few years since we considered wheat sown in April or May, on good land, ploughed the fall previous and harrowed in the spring, would yield a sure crop; but for the last few years the Hessian fly, the weevil, and rust have almost destroyed the crop; so that many of our farmers have abandoned the attempt to raise spring wheat.

This season, however, has been a more productive one, less weevil and rust, a fair yield both in quantity and quality of grain; so our farmers seem more encouraged to renew their efforts, hoping that some way will be found to overcome these common enemies. Many have deferred sowing until the last of May or first of June, and have thereby escaped the weevil, but sometimes lose by the rust. Amount of seed used, 1½ to 2 bushels per acre; harvest last of August or first of September. Winter wheat, within a very few years, has attracted the attention of some farmers. Although they commenced the experiment by sowing small parcels, it has succeeded beyond their expectations; and, from reliable sources, an estimate has been made, showing that more than 10,000 bushels have been raised in this and Kennebec counties the past season, all of which is now sown; so that we have now fairly made a beginning to grow winter wheat. The kinds mostly used are the white flint, kloss, or banner, and Oregon, sowed in September, 1 bushel per acre; harvest in August; average yield this season 25 bushels per acre mode of cultivation: ground well ploughed once, harrowed fine and smooth, seed sown, ploughed in with a small plough. Price this season from $2 $2 50 per bushel; spring wheat from $1 25 to $1 50 per bushe .

Corn.—Since the failure of the wheat and potato crop, corn has received increased attention, and has yielded good and sound crops o several years in succession. Although the last spring was very unpromising, yet the very warm fall gave another good crop. Various kinds are used here, according to soils—some eight, some twelve rowed. Mode o cultivation: about 12 loads—say 6 cords—of manure spread upon the acre and ploughed in, with about 4 cords put into the hills; average product 40 bushels per acre; average price at the farm 75 cents per bushel; plant in May, harvest in September or October; the land sowed with winter wheat in the fall, or spring wheat and grass seed the following spring. Very little is used for making pork or beef, but much used for domestic purposes; the surplus is used for teams lumbering, mixed with oats, and ground, and fed to oxen dry; what is used for making pork is ground and cooked—for making beef, ground and fed dry.

Oats.—On light and easy soil many oats are raised. Ground ploughed in the fall, sowed as early in the spring as the land will admit being worked. Seed used, 3 bushels per acre; average product, about 25 bushels per acre; average price, 30 cents per bushel.

A mixed crop of oats and peas is raised here in large quantities; used for making pork and beef, and provender for teams lumbering.

New land and old rough pastures are ploughed in the fall; sowed early in the spring, 2 bushels of oats and 1 bushel of peas to the acre; average product, 30 bushels per acre, weighing about 40 pounds per bushel; average price, 1 cent per pound at the farm; sold by weight.

Barley.—But little cultivated here until within a few years. Since the wheat and potato crops have been so uncertain, more attention has been paid to it. Used for domestic purposes and fattening swine; sowed in May or June on dry soil; 1½ bushel seed per acre; yields about 20 bushels per acre; average price, 75 cents.

Rye.—Until within a few years winter rye was considered a sure and profitable crop. New land, ploughed in June, and sowed to rye in August or September, was sure to yield an abundant crop; but for the last few years not enough has been raised for our own consumption. Many farmers have abandoned the cultivatiion of it, but the high price and ready sale still induce some to continue to raise it. Spring rye, for the last few years, has also been a very uncertain crop; in 1849 but little sowed, and the yield abundant; in 1850 much sowed, and almost an entire failure. Amount of seed used, 1 to 1½ bushel per acre; spring rye, 1 bushel per acre; sowed as soon as the fruit is out of the ground; harvest in August.

Peas.—Not many raised separate; on some light soils they yield a fair crop, but on strong and rich soil run to vine too much; mostly sowed with oats; when separated from the oats, usually sell for $1 per bushel.

Beans.—Raised mostly with corn, rarely planted alone, have yielded abundantly this year; worth $1 per bushel.

Clover and Grasses.—Clover, herdsgrass, and red-top, are the principal kinds used here. Average yield per acre, 1 ton; average price, $7; all consumed here. Land is so plenty and cheap, and labor so high, that nothing has yet been done to reclaim bogs or meadows. Although hay and pasturing are the leading objects for our farmers, yet they prefer the clearing of their upland, and getting it into grass, to spending their labor on bogs or meadows. Quantity of seed sown per acre, 12 pounds clover and 4 quarts herdsgrass, mixed, for upland; for wet land, 4 quarts herdsgrass and 4 quarts red-top per acre.

Dairying.—But little attention has yet been paid to dairies. Our distance from a suitable market for the produce of the dairy, and the difficulty of disposing of our calves, have compelled us to raise more cattle than were profitable; but now our facility for transportation is such (a railroad connecting with Boston) that an increased attention is being given to the dairy. Many farmers have reduced their sheep flock, and increased their stock of cows.

Cheeses are made during the warm weather—say 3 or 4 months; the rest of the season, spring and fall, butter is made. Average yearly product, about 200 pounds of cheese and 100 pounds of butter per cow. The amount of butter and cheese made is fast increasing, and the quality of both much improved. The manufacturing of butter from the milk, as soon as drawn from the cow, is not yet practised here. Our milk is set a sufficient length of time for the cream to rise; cream is then churned. After the butter is sufficiently worked from the butter-milk, it is salted, packed in tubs holding from 40 to 60 pounds each. Average price of butter, 12½ cents per pound; cheese, 8 cents per pound.

Neat Cattle.—Much improvement has been made in our neat stock the last few years; a less number is raised, much improved in quality, and prices increase accordingly. Three-year-old steers are now worth from $65 to $70 per pair on an average; cows, in the spring, $25; in the fall, $16. Very little beef is made here from corn. Our beef is mostly made from grass in the summer, and pumpkins and roots in the fall.

Our cattle are so much crossed that we have but very few pure bloods—Durham short horns most prevalent; some Devon and Hereford, and native. Native cows are still preferred for the dairy.

Sheep and Wool.—Sheep are considered by most of our farmers as a profitable stock, when wool will sell for 33 cents per pound. The breeds most kept here are merino and Saxony, crossed with the native, producing a middling-sized sheep, and a good grade wool; but the increasing demand for lambs and mutton, for other markets, is now inducing our farmers to obtain a larger and more hardy breed, such as the South Down and Dishley.

The difference in the price of coarse and fine wool here does not exceed 8 cents per pound, while the difference in the lambs and mutton far exceeds that; the large coarse-wool breeds cut about the same quantity of wool, and will raise three times as many of lambs as the small fine-wool ones. Flocks have been much reduced for the last few years, but now the demand is very great. Fat sheep are now selling here for $2 50 to $3 per head; good store ones, $2; lambs, $1 50 per head; average weight of fleeces, 3 pounds, sold this season for about 35 cents per pound.

Hogs.—Of hogs we have many excellent breeds—so much crossed with the common swine no definite name can be given to any. Our pork is mostly made from a mixture of oats and peas ground and mixed with boiled potatoes; none packed here for market; average price of sound hogs, 6 cents per pound; average weight, at 18 months old, 400 pounds.

Root Crops.—Since the failure of the potato crop, carrots, turnips, and beets are being cultivated as a field crop by a very few farmers; used for feeding milch cows, young cattle, and horses. Average yield of carrots, 400 bushels per acre; turnips the same; beets, 250 bushels.

Potatoes.—No sweet ones raised here; the Irish, once so sure and profitable a crop for food, both for man and beast, is now very uncertain. Before the disease made its appearance here, large quantities were raised for the manufacture of starch; were delivered at the mills, from the field, at 12½ cents per bushel. This season they promised fair until nearly matured, then rotted very fast; in some sections, a fair yield; in others, a total failure.

Many experiments have been tried to prevent the rot, but as yet none have fully succeeded; the best crops, however, are now raised on old pasture land, without manure; lime is sometimes used. Average crop, 110 bushels per acre; worth now 33 cents per bushel. Kinds most used, Chenango, long red, pink-eye, and peach-blows; none of which have escaped the malady. Plant early.

Cotton, Sugar-cane, Rice, Tobacco, and Hemp, not grown here.

Fruit.—The culture of apples is receiving increased attention on suitable soils, (and we have an abundance of it.) They can be made a

profitable crop to the farmer. Many farmers are of the opinion that sweet apples are worth one-half as much as potatoes for swine; very few fed to cattle.

Some farmers are using such apples as are generally used for cider to feed sheep in the winter, considering that the more profitable. Much attention is paid to grafting and building for winter fruit. Our distance from a suitable market makes fall fruit of but little value, excepting for drying and domestic purposes.

No pears or peaches raised here, and but very few grapes; none manufactured into wine.

Manures.—Very little attention is yet paid to making or preserving manures; all that is done is in the barn and hog-yard. Some loam or swamp muck is hauled in the yards and mixed with straw and manure from the loam; sometimes lime is mixed with them; used for planting.

Lime is sometimes used as a fertilizer, mixed with manures, or spread upon land intended for wheat and grass. Many farmers have used it on potatoes, thinking it prevents the rot.

Plaster, not so much used as formerly, does best on clayey soils; used on corn, potatoes, and grass mostly. No guano used here.

Agricultural Societies.—There are now three organized societies in this county, all having an annual exhibition in October. Somerset Central Agricultural Society, located in the centre of the county, including this town—Hiram C. Warren, of Canaan, president; organized about 15 years—has an annual exhibition in October. Much improvement is manifested in stock, crops, and domestic manufactures every year.

Our farming is now undergoing a great change. Since the opening of the Androscoggin and Kennebec railroad, giving us daily communication with Boston, a great demand is made for much of our produce, which was only raised before for home consumption. Veal calves, lambs, poultry, apples, eggs, butter, cheese, beans, and many other articles which were worth but a trifle before the opening of this road, are now duly called for, and such prices paid for them as to induce the farmer to turn his attention to raising them.

So, on the whole, our agricultural interests are improving; the new facilities for transportation are awakening this spirit of improvement, and doing much good.

I regret very much that I am not able to give you a more full report of the state of agriculture in this vicinity; but if any part of my response, herein contained, can be of any benefit to your next annual Report, I shall feel amply repaid for the time spent in preparing it.

Very respectfully, yours,

EDWARD ROWE.

Hon. THOMAS EWBANK, *Commissioner.*

INDUSTRY, FRANKLIN COUNTY, MAINE,
December 22, 1851.

SIR: Agreeably to the request in your Circular, I now proceed to give you my plan of breaking steers: Steers cannot be broken in one day, nor two, (unless you break their necks;) and for this, and other reasons, I com-

mence with them while young—say from one to two years old. In the first place, I provide myself with a suitable yoke, and bows as light as can be conveniently, without breaking. I then put them into the barn yard, or some other small enclosure, and if they are wild and afraid, work round them some time, curry and handle them over until they are more docile. If they are still afraid, turn them back into the pasture again, until the next day or so. Then get them into the yard again, and work them over as before; after which, catch the one I wish to have on the off or right side, and have some person bring the yoke and put one end upon him. Then let the other man hold him, and I walk round gently, until I can catch the other, when I lead him up to his mate, and put the other end of the yoke upon him. If they are tame, I can yoke them alone, by hitching the first one to a post or something, while I catch the other. I now have a little goad, and commence driving them about the yard, holding on to the near (left) one's horn, or end of the yoke, that they may not run away from me. I drive them round in this manner a short time, and, if I think I can manage them, open the gate, and drive them round outside the yard, or in the road. After I have driven them about a couple of hours or so, drive them back into the yard and unyoke, curry and turn them back into the pasture again. In a couple of days or so, put them through the operation again; and so on. The advantages arising from early training are numerous. King Solomon said, "Train up a child in the way he should go, and when he is old he will not depart from it;" and I know of no reason why this saying will not apply to steers as well as boys. Again: they learn quicker, and are easier managed; for they are not so strong as when older. When I wish to haw them to, I can motion to them with the stick, and, with the other hand hold of the yoke, haul them round, or shove them the other way, which I cannot do when they are from three to four years old—the age that most of them arrive at before they are handled. I know it looks like a small business to see a man driving a pair of yearling steers round, but I think it looks better than to see him driving a pair of three-year olds with a cudgel as large as a hoe-handle, and their noses bleeding, which is the effect of his club, for he says he could not stop them; or, see him dragging them round with a pair of oxen ahead; both of which are very common sights. When I have a pair of older ones to break, I pursue nearly the same course at first as with the younger ones; after which I put them into a team of oxen. The best place is on the road, or ploughing. I generally put a pair of oxen ahead a short time at first, that they may see what is wanted of them; then put them ahead to lead. In this way, I can learn them, in two days from the time I put them into the team, to lead, to plough, and keep the furrow, so that one man can drive the whole team.

But ploughing is not all; they should learn to go with the cart, and a little of most everything. The worst part is to learn them to back; it takes some time and considerable patience to accomplish this. About every time they are yoked, back them; drive them up and back them again, and again. After a while, put them to the cart, and back them down hill, where the cart will almost run of itself; afterwards, on a level; then up hill; and so on a little at a time. Half a day at a time is as much as they ought to work at first. The greatest failing in breaking steers is a lack of patience. I have known three or four persons to get a pair of wild steers into the barn-yard, and after hallooing and racing [illegible] over

the yard a number of times, and penning them up in corners, would succeed in yoking them, (at this time the poor steers begin to think they are sent for,) then put a pair of oxen ahead, and start into the field to work. If the steers go just like the oxen, (which is not very apt to be the case,) well and good; if not, there is a man each side of them, with a goad, trying to urge them along; and the steers, not knowing what is wanted of them, try to get away, when it is clip and strike, one or two on a side, and perhaps another behind. The steers, finding they cannot get away, haul in their flag and lie down. Then come the whips again, with, "Damn him, give him what he wants; he is a surly devil," and the like expressions. If these fail to rouse him to action again, they procure some straw, and, after placing it around him, set it on fire. By this time, the poor fellows think they have got *there!*

We Down-easters generally break our steers in the winter, as we have more leisure then. Neat stock has improved 10 or 12 per cent. in this county within ten years.

Respectfully, yours,

CHARLES GOODRICH.

CORNISHVILLE, YORK COUNTY, MAINE,
November 17, 1851.

SIR:—In compliance with the request contained in your Circular, I have attempted a statement of the crops and state of agriculture in this section.

The Patent Office Report is a document of inestimable value to farmers, and it augurs well for their future improvement, that they are beginning to appreciate it; and if I can throw my mite into this treasury of usefulness, I shall cheerfully do so.

Wheat.—This with us is a precarious crop. Guano is not used. The usual mode of culture is to sow, after a crop of Indian corn, manure. The ground is usually ploughed in the fall, after the corn is taken off, and again in the spring. About 1½ bushel is sown to the acre; the ground harrowed, rolled, and sowed to herdsgrass and clover. Usual time of sowing, about the 1st of May.

The two great enemies to this crop are the wheat fly (*Cecidomyia tritici* of Kirby) and the rust, (*Uredo rubigo*—red rust.) The first made its appearance here about 1834–'5. Farmers here, for several years back, sought to avoid it by sowing late; but in steering clear o Scylla they only ran upon Charybdis; for the rust has been found to be far more destructive than the fly. The usual mode of preparation for the seed is to soak it in a strong brine for twenty-four hours; then to mix with it from four to six quarts of fresh slacked lime to the bushel. This preparation is thought to be a complete prevention of the smut. Average per acre, 15 bushels; time of harvesting, the middle of August. Farmers are beginning to learn by experience what they might have known long before if they would have listened to men of science and exact experiment: that they save both in quality and quantity by reaping their wheat as soon as it is well out of the milk. There is no fact better established in farming than this.

VARIETIES.

The Red Chaff and Black Sea.—The *red chaff* is hardy in resisting the rust, and is considered richer in gluten than most other varieties.

Corn.—The most important crop by far; guano not used. The usual crop, about 40 bushels per acre. The cost of cultivation may be set down as follows:

Interest on one acre, cost $15	$0 90
Ploughing	3 00
Manure	10 00
Harrowing and rolling	$1 00
Planting	1 50
First hoeing	2 00
Second and third hoeing	3 00
Harvesting	4 00
	25 40
Produce per acre	$33 20
Corn fodder	10 00
	43 20
Deduct	25 40
Profit	$17 80

Cost per bushel, 44½ cents, reckoning the fodder as a part of the corn. The manure ought not all to be charged to the corn, as it generally suffices for two or more crops. This may perhaps be considered a fair statement of the crop here; but although the average may not be higher than forty bushels, fifty, seventy-five, or even one hundred, may be, and are often, raised by good cultivation.

Farms that have been long cultivated are being exhausted of many mineral manures, such as phosphates, alkalies, &c., essential to a fertile soil. These manures will have to be supplied, or else a sterile soil will be the result. It is well known to men of science that they can be measurably supplied from the soil itself by deeper tillage with the subsoil plough. On reading the account of it in the Agricultural Journal, I was induced to make trial of it, and, from what experience of it I have had, I no more would think of dispensing with its use than I would with the surface plough.

The course of rotation to this crop is, to break up the green-sward, after spreading the manure in a green state; plant with corn the first year; the next, wheat, with clover and herdsgrass; to remain in grass for several years.

The method of feeding to hogs generally preferred by the most experienced is, to grind the corn and cobs together and give them in a raw state. Some have tried them cooked, but it is thought nothing is gained above feeding raw.

The utility of grinding the cobs with the corn is two-fold; the cob acts mechanically by dividing the food, and thereby promoting digestion; and at the same time the cob—it is said by those who have made the analysis of it—contains from one-eighth to one-third of the nutriment contained in the corn itself.

Beans.—This crop might be raised to almost any extent, and is not thought to be an exhausting one. But the price paid per bushel is not thought by farmers to be remunerative, compared with other crops.

Market: Portland, thirty miles; price $1 25 to $1 75.

Clover and Grasses.—Clover is universally raised after wheat for fodder and as a fertilizer; its long roots bring up materials to the surface that would not be available with other crops. There is no truer saying than the common one, that "clover sweetens the land." Herdsgrass and red-top are generally sown with clover.

It is thought the hay makes much better fodder by being mixed. Quantity per acre, from one to three tons.

Dairy.—This department of agriculture, I regret to say, receives but a small part of the attention it so well deserves.

This region is admirably adapted to grazing; the lands hilly, abounding with clear springs, affording the purest water for stock; the natural grasses of the best quality for making butter and cheese. Notwithstanding these advantages, there is but little of the butter and cheese manufactured that might be—and that of an inferior quality. The goodness of butter depends upon—first, the food for the cows; and, second, the manufacture. The best of all food is sweet upland grass; the next, corn fodder, either green or well cured. The amount of butter may be much increased by feeding with roots of various kinds, provender, &c.; but it is quite doubtful if the quality remains unimpaired. Slops of all kinds should be eschewed by all who wish good butter.

In the making of butter, great attention should be paid to cleanliness while milking, and also in the dairy. Nothing should be suffered to be present that will produce impurity in the air.

Cream is remarkable for absorbing odors. We usually set our milk from twenty-four to forty-eight hours, according as the weather is favorable or otherwise. The churn is a revolving box. The butter is longer *coming* in this churn than with most others, but it is believed the quality is better and the quantity greater from a churning of one and a half hour than from a less time. After churning, from one-half to three-fourths of an ounce of salt to the pound of butter is mixed with it, when it is set away for twelve hours. It is then worked over, and the salt well incorporated with the butter, and the buttermilk well worked out by means of a lever placed upon an inclined table. The hands are never allowed to come in contact with the butter. The perspiration from the hands, although it may not be sensible, greatly impairs the purity and flavor of the butter. The butter is next pressed by lever power in moulds containing about one pound, if it is intended for market immediately; if not, it is pressed into clean oak firkins, holding from 50 to 100 pounds, and covered so as to completely exclude the air, where it will keep for any length of time.

The yearly average per cow may be set down at 100 pounds of butter and 200 pounds of cheese.

The price of butter in Portland, or the nearest market, has been for several years past about one shilling per pound; cheese from 6 to 7 cents. These prices, of course, are not what might be and are obtained for superior articles; but, as I said before, few are willing to give that attention to the subject which is necessary to insure the skill and intelligence it demands.

Neat Cattle.—The usual price of three-year-old steers is $20; heifers, $15; average price of good dairy cows, $30 in the spring, $20 in the fall.

The method of breaking steers to the yoke is, to put them before a good yoke of oxen in the team; by this means they soon become teachable.

Horses and Mules.—The breeding of horses is considerably attended to, and is thought to be profitable. The price varies from $75 to $200.

The manner of breaking young horses varies with the tact or whim of the owner. There seems to be but one principle, however, among those who understand the matter—and that never fails to succeed—which is, to begin early, to use gentle means, and to follow up this course till the animal is broken.

Potatoes.—The average of this crop I should think to be 175 bushels per acre. The most prolific variety, the "pink-eye," since the rot made its appearance, are generally planted without manure. Although manure is not the first cause of the rot, it is thought to be among the predisposing causes. They are planted on green-sward, cultivated, and hoed once.

Fruit Culture.—In answering your query, "whether the culture of fruit is receiving increased attention," I regret that I cannot answer it in the affirmative. The soil and climate are excellent for raising apples; especially winter fruit. With regard to the second query, there is but one opinion among those who understand anything about the matter, and that is, that nothing which pertains to the farm pays so well as orcharding. A neighbor of mine, who has a fine orchard, has often said to me he wished that his whole farm was planted with apple trees. And his farm is among the best for raising fine cattle and horses, and for dairy purposes. As to the comparative value of apples and potatoes, I can speak with confidence after an experience of some 15 or 20 years. I was among the first in this place to use apples for feeding hogs. My neighbors all said they were worthless, but I had *faith* enough to follow up the experiment, and the result was *always* to find my hogs in a better state in the spring, when fed on apples alone, than when fed on corn or potatoes alone. The apples generally fed to hogs are the sweetest, and most worthless for anything else. Such apples I would not say are equal, bushel for bushel, to potatoes; but if the apples are of good quality for eating, (say part sweet and part sour,) I have no hesitation in saying they would be fully equal to potatoes. The varieties best liked for winter use are the Baldwin and Rhode Island greening.

The Roxbury russet also is kept for winter, or rather summer, as they are not in use till May or June. The only practical mode of grafting here is crown-grafting. Budding is preferred by nurserymen generally.

Manure.—Plaster is universally used as a fertilizer. It is generally applied to the corn and potato crops in the hill, at the rate of 1½ bushel to the acre. I have applied it broadcast upon green-sward, before ploughing, with equally good success. Wood ashes are sometimes combined

with it, and sometimes applied alone; both are valuable. Ashes contain potash, lime, and soda. Their use depends upon these alkalies, which render them a very efficient manure.

Meteorology.—I regret that this part of my communication is necessarily meagre. I am making arrangements, however, for a series of thermometrical observations, which shall be worthy a place in your valuable Report. Our hottest weather is in July and August; our coldes tin January. The highest average of the thermometer, 96°; the lowest 20° below cipher of Farenheit.

I have replied to questions upon such subjects only as were sufficiently familiar to warrant me in giving answers that may be considered reliable.

Wishing you entire success in your useful labors, I remain, most respectfully, yours,

G. W. GUPTILL.

To the Commissioner of Patents.

South Freedom, Waldo County, Maine,
December 28, 1851.

Sir: I take the liberty to write a few lines on the subject of *agriculture* in this vicinity.

Our soil varies, for the reason that the face of our country lies in large ridges; and hardly any two are composed of the same mineral substance.

The change in farming in our county seems like emigrating into another country.

It is about fifty years since this county was first settled.

The course pursued was: in the month of June to chop down large patches of forest trees, and either in the spring or fall set fire to the brush, and obtain a rapid burn, if possible. If the timber could be cleared off, the ground could be planted with corn or sowed. If not cleared, it was always planted, nevertheless. Lumbering was also a smart business. The most of this is done away with. Ploughing is the principal way of farming, and people are beginning to wake up to the best methods to procure muck, (a manure found in low places,) made of vegetable matter. It is attracting much attention, and will eventually be the strong arm of farming.

Our very cold seasons produce good wheat; hot seasons, corn. Spring wheat heretofore has been mostly sown; red sea is the kind mostly in use. Time of seeding, 10th of May. Crop this year very good. Price at this time $1 per bushel.

Winter wheat is attracting much attention, and will in all probability take the lead. The eight-rowed yellow corn is generally grown. Time of seeding, 20th May. Crop very poor this year, in consequence of early frost. Beans and oats are generally a certain crop. They are in good demand at this time. Price, $1 33 for beans; 35 cents for oats.

Hay Culture is a good business; clover and timothy mostly raised. The 15th of July is about the commencement of haying. Price on an average $8 per ton.

Stock is also quite a trade. There are from 500 to 1,000 head collected in this town yearly, (a portion of them from adjoining towns,) and

driven west. They find a market in Portland, the large towns in New Hampshire, and Brighton.

The raising of eggs has become a profitable business, and pays the best of anything that our farmers pursue for the cost. Average price 12½ cents per dozen. It was estimated that the amount sold in the year 1849 from the State brought $600,000.

Potatoes, in years past, have been the great staple of Maine up to 1845, which was the first failure; it was a certain crop.

Pork and beef were made in great abundance, and potatoes were fed to cattle, in stalls, in the room of provender; 25 cents per bushel was an average price. Since 1845 the crops have been almost a complete failure, and many farmers abandoned the business. What were planted this year, and raised, are better, and rot less, than either of the five years past.

Apples are the only *fruit* cultivated to any extent. Winter fruit is the most in use, and is obtained by grafting. Thirty years ago apples were a rare article. By the industry of our farmers, there are, yearly, lots shipped to the West Indies and other places.

The tame cherry is about all the cherry that is cultivated with us. About ten years ago there appeared a barnacle upon the limbs of the trees, which has since that time completely annihilated all the trees, and there is not one to be seen in the country.

Respectfully, yours, &c.,

NEHEMIAH SMITH.

Hon. THOMAS EWBANK,
Commissioner of Patents.

NEW HAMPSHIRE.

HAVERHILL, GRAFTON COUNTY, N. H.,
December 24, 1851.

SIR: The postmaster in the village handed me an Agricultural Circular a few days since, and wished me to answer it. Thinking it possible I might give some information, I send you the following:

Wheat.—There has been but very little done for some years past in raising wheat; but for the last two years we are doing considerable with winter wheat, especially this last year. It is mostly raised on old pasture land and corn ground; average yield twenty-five bushels—greatest yield one hundred and seventy-five bushels on five acres. Spring wheat mostly sown late—about the first of June; average yield fifteen bushels; average price for 1851 is $1 33.

Corn.—There is a good deal raised upon the bottom lands. Cost of production from 25 to 40 cents per bushel. Average crop 50 bushels. Guano is not used to any amount, in this vicinity, with this crop. The corn is mostly ground, and fed to our teams—oxen and horses; sometimes cob and all, but mostly threshed.

Oats, Rye, Beans, and Peas.—Average yield of oats, 40 bushels; rye, 15; beans, 15; oats, the least exhausting; peas are not used as a renovating crop.

Clover and Timothy.—Average yield per acre, one and a half ton. Clover is considered the best fertilizer; and timothy and clover for laying

down meadows; 12 quarts of timothy and from 4 to 6 pounds of clover the quantity used per acre. The cost of growing hay depends upon the value of the land; on our meadows, from three to four dollars per ton.

Dairy.—The average yearly product is 100 pounds of butter, and 100 of cheese, or 150 of butter alone, per cow. Cost of making butter, two and a half cents; cheese, one and a half cent. My mode of making cheese is this: The milk is set in brass kettles, with a large spoonful of rennet to a pailful of milk. After two or three hours, it is crossed off, to allow the curd and whey to separate; then in the morning it is dipped off before setting the morning milk, which is then used in the same way. It should not be hurried in any of the operations. After it is wheyed off, dry; then scald very slightly; then break or chop the curd and salt it, at the rate of a common-sized saucerful to a half-bushel heap. Cheese is usually worth from 7 to 8, and butter from 12 to 18 cents per pound. Good cows are worth $25 in the spring, and $15 in the fall.

Hogs.—The best breed now with us is the Suffolk. The cheapest way of raising pork is to keep pigs on milk through the summer, then fatten them on corn and apples; 100 pounds of corn will yield from 16 to 18 pounds of pork. We salt our pork in clean salt, packed edgewise, and add cold water for a brine. For hams, 4 quarts salt, 4 ounces saltpetre, and 1 quart molasses, to a hundred of meat.

Potatoes.—The rot has troubled us so much of late years, that there are not so many raised as in former years. We find that we avoid the rot very much by early planting—say by the middle of April.

Fruit.—We are giving a good deal of attention to the raising of fruit, more especially apples. There is no doubt but what it is one of the most profitable crops that can be grown on a farm. Sour apples, boiled with pumpkins, make very good feed for hogs; and I think sweet apples are worth more than potatoes, bushel for bushel. The best variety for winter are the Roxbury russet and Baldwin.

Manures.—In making our compost heaps, we use both lime and plaster. I make my compost, in the fall, of muck, with about one-fourth part yard manure, and one-fourth bushel of lime, to every load of muck, to hasten the decomposition; and I also use some plaster to prevent its wasting. I shovel it over once in the spring before using it. After treating it in this way I consider it equal to my best manure.

I remain yours, very respectfully,

HENRY MERRILL.

DOVER, N. H., *January* 17, 1852.

SIR: Your Circular of August last, addressed to me, asking for information in relation to the state of agriculture in this vicinity, came duly to hand. I exhibited the Circular to such of our farmers as I considered best qualified, by experience and practice, to answer the interrogatories therein, and have waited in vain for them to furnish those answers to this late day. I do not feel myself competent to give the subjects embraced in the Circular that attention which their importance demands; but I will venture to dot down the results of my observations, and what

little experience I may have gained of the subjects, in this immediate neigborhood.

Wheat.—This grain is not extensively cultivated in this region, nor has guano been introduced as a manure. When this grain *is* cultivated, the yield is generally 20 bushels to the acre, and, when exhibited for sale, brings $1 12 per bushel.

Corn.—The corn crops are not large, it being raised mostly for home consumption. The common yield is from 25 to 40 bushels to the acre, and experience has taught the farmer in this vicinity to plough in autumn 5 or 6 inches deep; and in the spring to apply manure liberally, and plough again deep enough to mix well the soil and manure. The best method of feeding this grain is when ground into meal.

Oats are raised in small quantities. I think 30 bushels per acre an average crop; the quantity of seed sown, 3 bushels per acre. The average crop of barley is about 20 bushels to the acre; quantity of seed sown, $2\frac{1}{2}$ bushels per acre.

Rye is now a profitable crop, and least exhausting to the soil—yields 25 bushels to the acre; seed about 1 bushel.

Butter.—I have no data for estimating the quantity of butter made in this county; but, from my own experience, I should think about 140 pounds per cow for the year. There is but little cheese made in this county.

Neat cattle.—Cost of raising until 3 years old, $18 50.

Horses.—The raising of horses is profitable, and the expense of raising till 3 years old, about $50.

Potatoes.—No sweet raised—the average yield of the common, 100 bushels per acre; cost of raising the same per bushel, 20 cents.

Fruit.—The culture of fruit is increasing, and can be made very profitable. The Rhode Island greening is the best winter apple, and the Roxbury russet the best for spring use and exportation.

Manure.—Cellars under barns are much approved for manure, with floors so arranged that the water from the cattle runs on the manure, and, by having dry sward or dried and pulverized muck to absorb the extra moisture, makes more and far better than throwing it out to be washed by the snow and rain. In collecting the depth of rain falling through the year, I take the years 1843 and 1850:

1843.		1850.	
January - -	2 inches.	January - -	$5\frac{42}{100}$ inches.
February -	$1\frac{15}{100}$ "	February -	$1\frac{67}{100}$ "
March - -	$4\frac{40}{100}$ "	March - -	$1\frac{75}{100}$ "
April - -	$2\frac{60}{100}$ "	April - -	3 "
May - -	3 "	May - -	9 "
June - -	$5\frac{25}{100}$ "	June - -	$1\frac{93}{100}$ "
July - -	1 "	July - -	$4\frac{64}{100}$ "
August - -	$4\frac{25}{100}$ "	August - -	$5\frac{47}{100}$ "
September -	$\frac{6}{16}$ "	September -	$5\frac{53}{100}$ "
October - -	$3\frac{10}{100}$ "	October - -	1 "
November -	$2\frac{60}{100}$ "	November -	$3\frac{25}{100}$ "
December -	0 "	December -	$3\frac{25}{100}$ "
	2ft. $7\frac{95}{100}$ "		3ft. $9\frac{91}{100}$ "

It is not possible for me to obtain the mean temperature of each month, but I herewith transmit the mean temperature for each year from 1833 to 1843, with the addition of the depth of snow in this town during the same years—

	Temperature, degrees.	Depth of Snow, inches.
1833 - - - - - -	$45\frac{1}{10}$	99
1834 - - - - - -	$45\frac{1}{4}$	$59\frac{1}{2}$
1835 - - - - - -	$43\frac{5}{8}$	52
1836 - - - - - -	$42\frac{8}{10}$	89
1837 - - - - - -	$43\frac{3}{10}$	45
1838 - - - - - -	$45\frac{8}{10}$	72
1839 - - - - - -	$46\frac{8}{10}$	43
1840 - - - - - -	$46\frac{7}{10}$	82
1841 - - - - - -	$46\frac{8}{10}$	92
1842 - - - - - -	47	$52\frac{1}{2}$
1843 - - - - - -	$45\frac{2}{10}$	$113\frac{1}{2}$

I have the honor to be your obedient servant,

GEORGE T. WENTWORTH,
Postmaster, Dover, N. H.

VERMONT.

BARRE, WASHINGTON COUNTY, VERMONT,
December 11, 1852.

SIR: I received your Agricultural Circular some time since, and have not had sufficient leisure to give a detailed answer; but I will give you a short account of what we think the most profitable and least expensive mode of raising *wheat, corn, rye,* and *oats* in this vicinity.

As a sample, I will take my farm, which contains 90 acres—40 acres in tillage, 30 pasture, and 20 wood and timber.

I plant to corn 2 acres—take a piece that is bound out, or bears the least grass, and draw on (the last of April) 20 loads of barn yard manure, and spread to an acre; then plough it 6 inches deep, turning it flat; then harrow it mellow, but not to disturb the turf; then furrow it lightly, 3 feet apart. I then take of manure made the summer before, and hog manure—drop a small shovelful in the furrow, $2\frac{1}{2}$ feet apart, and plant the corn from the 15th to the 20th of May. I harvest in September, by cutting it up at the ground, and let it stand in the stack two or three weeks; then I take it to the barn and husk it. Seventy-five bushels are an average yield to the acre, and 500 pounds husks, which are worth $1 per 100 pounds for making mattresses. The average price of corn here is 75 cents per bushel. After the corn is off we plough the ground so as to sow it with wheat early in April, (without ploughing in the spring,) and get about 20 bushels per acre; or, if the spring is backward, we sow with oats, and get 50 bushels per acre.

For *potatoes* we break up green-sward in the spring, with about the same quantity of coarse, or straw manure; spread on the grass before ploughing, as we use for corn; then turn it over, and harrow it fine, and

plant (without manure in the hill) 3 feet one way and 1½ foot the other; hoe twice, and dig in September. Average yield, 200 bushels per acre.

We then plough, and sow with winter rye, the first of October, and seed with herdsgrass, (timothy,) six or eight quarts to the acre. If the land is in good heart, or well manured, six quarts are enough. We use the same seed and quantity on wheat ground.

We attend to the *dairy* business to some extent in this section. Our cows are mostly native breeds, and we think they are about equal to the Durham or Ayrshire, with the same keeping. We let them get their living in the pasture in summer, and keep them on hay and corn fodder (stalks) in winter. In a dairy of 20 or 30 cows a fair average of butter per cow is 100 pounds, and is worth 16 cents per pound; but some dairies turn out much more. A neighbor of mine sold last year, from 11 cows, 2,190 pounds of butter, besides what was used for the farm by 7 persons. The milk, where some is given to the hogs, nearly fattens them. Hogs 20 months old will weigh from 300 to 500 pounds; and pigs 8 months old will weigh, on an average, 250 pounds. What are called the "grass fed" are the largest, but will not fat as soon as the Suffolks.

There are many fine *horses* raised in this town. It is profitable, as a colt 3 years old will cost $45 or $50; the average price is not less than $75. With regard to breaking colts, a man who is used to it will break one in from 3 to 6 weeks. In the first place bit them, by putting on the bridle, and draw the reins tight, and fasten them to the surcingle just back of the withers, and let him wear it two hours occasionally; then put him beside a steady horse in the harness, attached to the plough, wagon, or sleigh a few times; then use him alone, being very gentle with him, and in a few days he is broken. Keep him well, and make it a point not to go by him without speaking to him, and pat him, and he will soon learn that you are his friend, and he is broken before he knows it—and that, too, without whipping or injuring him—the law of kindness applying as well to brutes as to man.

Very respectfully, yours,

OSMAN DEWEY.

Hon. THOMAS EWBANK,
Commissioner of Patents.

BRISTOL, ADDISON COUNTY, VERMONT,
January 8, 1852

SIR: Your Circular, addressed to me as president of the Addison County Agricultural Society of Vermont, was duly received. My remarks are chiefly applicable to this county.

Wheat.—Guano is not used in the production of wheat or any other crop in this county to my knowledge; as a general thing, winter wheat follows corn or peas.

Manure.—Barn-yard manure is applied to the previous crop—say 10 or 15 loads per acre, ploughed once; usually from 6 to 8 inches deep. The production of winter wheat is increasing in this county, both in yield per acre and number of acres. Some make 50 bushels per acre, but this is rare, and only on favorable locations with the best of husbandry; perhaps the average yield per acre is about 20 bushels. The

white bald, or Genesee wheat, is generally preferred; price $1 per bushel. Spring wheat has not done as well for the last two or three years as formerly. The Black Sea has done the best of any variety.

Corn is a valuable crop to the farmer, and usually a profitable one, although this year may be an exception; perhaps not more than half an average crop in the county, in consequence of an early frost and a very severe drought; still there are some extra good crops. We plant about the middle of May, and harvest about the middle of September. There are a great many varieties cultivated in this vicinity, mostly yellow; cannot say which is best. The best system of cultivation here in the interval is to manure on top and incorporate thoroughly before planting; on clay or loam, the better way is to manure on the sod and turn under. We use gypsum or ashes on the young plant soon after it comes up. Our best farmers grind all their grain for feeding animals, and consider it good economy.

Oats are much cultivated, but considered an exhausting crop; has averaged this year about 40 bushels per acre. Sow 2½ to 3 bushels of seed per acre. Peas, beans, or rye are not cultivated to much extent in this county.

Hay was a full average crop the past summer—I should think over a ton per acre. Most farmers stock with clover and herdsgrass seed—say 12 qts. of herdsgrass seed, and 8 or 10 pounds of clover seed, per acre. The best fertilizers are, compost manures and gypsum *for top-dressing*.

I have been disappointed in obtaining the desired information as to *dairies*. The cost of raising neat cattle varies according to the price of hay. Three-year old steers range from $30 to $40. Dairy cows usually sell in the spring for $25 to $30; in the fall for $16 to $20. Cannot say what amount of beef 100 barrels of corn will produce; but am confident that a given amount of food will produce more meat in a Durham, Devon, or Hereford, than in a native animal. The easiest mode of breaking steers is, for boys to accustom them to the yoke as early even as from 3 to 6 months old; but they are not put to service much until 3 or 4 years old.

The breeding of *good horses* has always been a lucrative business, and our county horses are considered among the *best* in any market. The cost of raising a colt to 3 years old will vary under different circumstances. My experience is, that the mare should be allow to run with the colt, without doing any service, until the colt is 8 or 10 months old, and then wean the colt, beside the mare, on hay. The colt should always be well fed, and kindly treated, and accustomed to the harness while young, beside a gentle and well broken horse, but should not be put to hard service until fully matured.

Sheep and wool are staple articles in this county; the breeding of stock and wool-growing have been prosecuted a number of years, and probably will continue to be a good business to intelligent and experienced breeders, and of such we have a goodly number.

I know of no experiments having been made to ascertain what amount of wool a given amount of hay will produce; but I think a pound of merino wool can be produced as cheap as any, all things considered. The sheep in this county are mostly of Spanish and French merino; of the latter we had a large importation last season.

Roots, as sugar beets, carrots, and Swedish turnips, are being culti-

vated to some extent as field crops. I have reduced the labor very much in raising the beet and carrot crop by the use of a *seed sower* and *wheel hoe* of my own construction, as follows: The seed sower is simply two light wheels—say 14 inches diameter—made fast to a shaft 4 inches diameter, turned down three-fourths of an inch at each end for gudgeons, and 2 grooves, 16 inches apart from centre to centre, deep enough for seed boxes, over each of which is slipped a tin band with holes for the seed to pass. This is set in a frame similar to the frame of a wheelbarrow, and revolves as the wheels are pushed forward. There are two pins set in the frame directly in front of the seed boxes which make the furrows for the seed, and directly behind the seed boxes is attached a rake or roller to cover the seed. With this implement a person can sow two rows at a time as fast as he can walk, without stepping on either of them. The hoe is made thus: take two wheels—say 8 inches in diameter; attach them by an Ex of the desired length to run between the rows, as sown by the seed sower; take a thin piece of plate steel—say 13 inches long; rivet one end of two arms to the blade, and screw the other end of the arms to the front side of the Ex in such a manner that the blade will lie flat on the ground; then attach a handle 4 feet long to the back side of the Ex at a proper angle, that you may walk erect, and you may pass it between the rows as fast as you please to walk; you can regulate the depth of cultivation by elevating or depressing the handle; the ends of the blade should set in range with the outsides of the wheels, that you may push it forward rapidly without danger of cutting the plants, the wheels answering for a guide to the eye. This implement should be used on the field as soon as the plants are large enough to follow the rows, and as frequent as is necessary. In preparing the ground, I plough as deep as I can with an ordinary plough, and manure as for corn; feed mostly the milch cows horses, and calves the first winter, and find them an indispensable crop produce from 600 to 800 bushels per acre. I hardly know what to say in regard to potatoes; all varieties suffer more or less with the rot; the Cork reds are perhaps the least affected of any. All systems have failed under different circumstances, and there seems to be a falling off in yield per acre, aside from the rot. I think the average for the county will not go above 80 bushels per acre, although the crop has not suffered as much with the rot this year as last.

Fruit is receiving increased attention. We have several nurseries started in the county, including all the best varieties of fruit; and, I think, are well patronized. To promote the cultivation of fruit, we have been liberal in our premiums, and it has undoubtedly had a great and good influence upon the community; and perhaps it would not be saying too much to say that our county agricultural society has been the means of a decided improvement in the general management of farms and the breeding of domestic animals.

With my best wishes for your success in the forthcoming Report, and that it may be of great use to the agricultural community, I am, sir, respectfully, yours,

CHARLES L. SMITH.

Hon. THOMAS EWBANK,
Commissioner of Patents

BRAINTREE, ORANGE COUNTY, VERMONT,
December 20, 1851.

SIR: In replying to your Circular, I shall only report on sheep, wool, and fruit.

"Is *wool-growing* profitable?"—Most of our farmers think not; and from two and a half pounds of wool to three and a half do not pay in this State, which is almost the average per fleece. There are men who shear from five to six pounds of well-washed wool per head, and those make it profitable.

The merino sheep, which weigh from 60 to 100 pounds, of round form, healthy, long, thick, fine wool, are the most profitable.

Some flocks of 100 sheep, which it is estimated consume 18 tons of hay, will shear 600 pounds of wool, and raise from 80 to 90 lambs. Such flocks are profitable; and when our farmers understand their own profession, they will improve their flocks, which is easily done by saving their best ewe lambs for breeders, instead of selling them to drovers and keeping their poorest, as is usually the case.

A sheep weighing 100 pounds, live weight, should shear from 8 to 12 pounds of washed wool; and I have no doubt that with care it can be done by proper crossing.

From 20 to 40 pounds of fine merino wool can be grown from 1 ton of hay, and from 15 to 25 of ordinary coarse wool. Large sheep may be more profitable for mutton, but small, healthy, fine ones for their fleece and mutton combined.

About four-fifths as many lambs raised as there are ewes.

There have recently been a large number of large French merinos imported into this State. The sheep are large, well-formed, skin in coarse folds, and weigh from 200 to 300 pounds, and are said to shear from 12 to 30 pounds unwashed wool. Many are confident that a cross of them with our small merinos will improve their flocks. I don't believe that they will produce as much wool from a ton of hay as our small merinos do, and a cross will tend to impair our best flocks.

Fruit.—When our State was first settled, and young orchards planted of the native varieties, no place in the world provided apples more bountifully than some parts of this State. Cider was a drug at 50 cents per barrel. In many parts of the State there were more cider mills than school-houses, and more distilleries than places of public worship. Every orchard planted seemed to flourish. The soil was full of vegetable mould, and the trees set were healthy. Being reared near where they were set in the orchard, making them perfectly acclimated and of natural growth, they could withstand our hard winters, and, having a rich soil to support them, abundant crops were the result.

Some trees were grafted 40 or 50 years ago; those have borne abundantly. There are orchards which yield from $200 to $500 to the acre. Most of the old orchards are dying, and there is not one fourth enough good apples grown here to supply the wants of the people. Within a few years a great many thousand nursery trees have been brought from their sandy soil in Massachusetts and New York; but they do not flourish. They soon prove to be rotten at the heart, and die.

We must raise our own trees on our hard soil, graft them in the limbs, or at least three or four feet from the ground, (for the natural stock is harder than the grafted,) and set them for the orchard, on land recently

cleared and rich with vegetable mould, and where it will be protected from the alternate thaws of winter; and if on the streams and in the valleys, a northern slope is preferred; on high land, a southern or eastern is best.

We have about 4,000 young apple and plum trees set for orchards, for those set on old land we dig a hole six feet across, and from twelve to fifteen inches deep; mix four or five bushels of compost manure with the soil where we fill the hole, and have the tree planted just as deep as it was when it stood in the nursery.

The ground around the tree should be covered with straw, or leaves, to protect the tree from drought, and to keep the grass from growing. We are well satisfied with the esult thus far.

We have about 2,000 sc. on land that was cleared without a burn. The soil is rich, with an abundance of vegetable matter, which is usually burned when the land is cleared.

Trees set two years; holes were dug three feet in diameter and one foot in depth; about ten bushels of decayed leaves put around each tree for mulching. Last season we mowed the grass, and put it around the trees when it was green, to kill the grass under the tree and keep the soil light. Thus far we are well satisfied with the result.

To protect the trees from the mice, we take blocks of wood six inches in length, by three in diameter, and, with a six-quarter auger, bore a hole four inches in depth; mix one dessert-spoonful of arsenic with one quart of Indian corn meal; or, in that proportion, put one spoonful in each box, prepared as above, and put it under each tree, beneath the mulch, and renew the meal once or twice each year. This proves a secure protection.

We have quite an extensive nursery--mostly of apple trees. With proper management, as good trees and as good fruit can be raised in this State as in any State in the Union.

Trees grafted in the root, as is practised in many western nurseries, will not flourish here, being too contrary to nature for our climate; neither should young trees be trained to a stake, as some nurserymen practise. Training to stakes makes them small at the bottom and large at the top of the stake. True, they are straight; so is a young lady who wears corsets; but they are both feeble and short-lived.

I have not known of a tree taken from sandy soil that has done well. We have a few thousand pear stocks, which had grown one year on sandy soil, and they are worthless. Leaves fall in August, while those grown on hard soil remain bright till November.

The Baldwin is our best apple for late winter and spring use; also, for growth. With good care, one thousand bushels can be raised on an acre of ground in one year.

Porters are our best late fall and early winter apples.

Sweet apples might be raised to great profit for our stock. Our sheep-pastures might be covered with sweet-apple trees to great advantage; for there is nothing that will fatten sheep as fast as sweet apples. Plums do well, and no doubt an abundance of the best varieties can be grown here.

In grafting old trees, limbs from three-fourths to 1 inch in diameter are best to cut. Large limbs grow the scion too fast the first season, starts the composition, and the grafts are very liable to winter-kill. Small

limbs heal over the scions the sooner, and bear abundantly the third. We have not one agricultural or horticultural publication in the State. Political, religious, and miscellaneous abound; but the day is not far distant when the people may learn that we live by agriculture.

Respectfully,

LEWIS H. SPEAR.

To the COMMISSIONER OF PATENTS.

SPRINGFIELD, VT., *January* 10, 1852.

SIR: I have been thus far remiss in not complying with your request for a communication for the Patent Office, and, in responding at this late period, must beg the privilege of confining myself to a few observations of practical experience of my own method of farming.

I am located upon the alluvial flats on Connecticut river—a soil naturally rich and fertile; but, as it grows old by cultivation, it loses the essential ingredients necessary to the production of certain kinds of crops, particularly that of wheat.

The soil of this part of our county never was sufficiently impregnated with lime to become a permanently wheat-growing district, and the cultivation of this valuable grain is, in a great measure, abandoned.

Indian corn, *oats*, and the various kinds of cultivated *grasses*, are the most remunerative and profitable of any crops that can be grown at intervals upon the borders of this beautiful river, and nowhere in the known world, I believe, does there exist a better soil for the production of these crops; but even here they will not grow spontaneously. It requires care and labor, skill and judgment; and, these properly exercised, a sure annual return in full compensation is the result. In order to insure a good crop of corn, deep ploughing, high manuring, and thorough cultivation are indispensable. My method is to break up the mowing lands late in the autumn, as fast as they decline in grass, down to one ton of hay to the acre, turn the sward flat over to the depth of six inches, and roll them down smooth with a revolving plank or log-roller; and early in the following spring harrow lengthwise of the furrows until the soil is pulverized and mellow, without disturbing the sod; then seed with oats, and harrow crosswise, applying 50 pounds of plaster to the acre as the young oats begin to appear above surface. I generally obtain from 45 to 50 bushels to the acre. Upon this same field, the next spring, I put on 50 ox-cart loads of manure to the acre, from the cattle, sheep, and hog yards; spread it broadcast, and plough ten inches deep; harrow well after ploughing, and plant with Indian corn from 15th to 25th of May, as the season happens to be; rows 4 feet, and hills 2 feet apart. At the first hoeing, which I have done with great care and neatness, the stalks are reduced to three in each hill; after which a compound—of three parts of unleached ashes, two parts of slaked lime and one part of ground plaster, well mixed—is applied—a large single handful to each hill of corn, and after the second hoeing, plaster alone; a common table-spoonful to each hill is applied; the third hoeing soon follows, using the cultivator each time, and elevating the earth but slightly around the hills of corn, and keeping the crop essentially free from weeds, grass, and everything else that takes sustenance from the soil.

Of my corn crop the past year, (of about ten acres,) two acres were accurately measured; and the result was, from one acre a fraction short of 93 bushels, and the other acre 88½ bushels of shelled corn, weighing 56 pounds to the bushel. The drought late in the summer injured the crops some, or there would have been as many bushels as I received in 1849, viz: 416 bushels from four acres of land. The last crop before returning again to grass, and with which I sow my grass seed, is another oat crop, after ploughing again ten inches deep, and seeding with not over two bushels of oats to the acre, in order that the straw may expand and get strength to hold itself up with long and heavy heads upon the top, and also that the grass seed may take root and come forward better. It is a common saying among farmers here that oats are a bad crop with which to seed down grass. I have always practised it, and never lost a seeding or failed of grass in abundance. Of the oat crop of the past year, which followed the corn crop of the year previous, there were 88 bushels to the acre, weighing 34 pounds to the bushel. The kinds of grass I cultivate are timothy, clover, clover and red top, and sow half a bushel to the acre. I always sow broadcast 50 pounds to the acre of gypsum on the grass lands in the spring of the year, and I believe with good success. Guano has never been used to any extent in this section. After going through the process above described, the same field will produce grass six years—the first three from 3 to 4 tons to the acre, and the last three from 1 to 2½ tons—when it is again ready for another routine of grain crops. In old and new mowing lands I cut over about 50 acres the past year, and had not less than 125 tons of hay —2½ tons to the acre upon an average; the cost of which when in the barns, counting six per cent. interest on the lands, at $100 per acre, (which is no more than its cash value when in a high state of cultivation,) is $4 per ton. The cost of obtaining a crop of corn by the above process, counting the stover to pay the harvesting, and charging nothing for the manure, except the labor in applying it, as it is made from and belongs to the farm, is not above 30 cents per bushel; and for oats, counting the straw to pay the threshing, 20 cents per bushel. But I wish to be understood that these estimates apply only to the soil and manner of cultivation here described. On our common and ordinary lands, with common and ordinary cultivation, the expense must be nearly double. Corn should be ground to feed to horses or cattle, and both ground and cooked to give to hogs; but may be fed to sheep in a natural or raw state to advantage, as this animal appears to possess powers of digestion stronger than the horse, the ox, or the hog. At the prices for which wool has been sold for the last two years it is profitable in this section.

Wool.—The cost of growing fine or coarse wool is not materially different, so far as the fleece is concerned. The carcass of the coarse sheep is larger, and better adapted to mutton; yet it is a law of nature, that in rearing, sustaining, and fattening an animal, it requires nutrition in proportion to the natural weight of carcass; and from this view of the case I am satisfied that the small, short legged, round-bodied merino sheep, with a close, compact, even, and fine fleece, with a good length of staple, and averaging, in flocks of 400 or 500, 3½ to 4 lbs. of wool per head annually, are the best and most profitable kind of sheep that have ever been introduced into this country. It may be that I estimate this

kind of the woolly race too high, for of this kind is my own flock, and I have no inclination to change it for anything better. I clipped a few over 500 fleeces last June, which averaged in weight 4 pounds per head after a thorough cold-water wash over the sheep's back, and sold at 45 cents per pound in August. The average weight of fleeces in Vermont, I think, will not go over 3 pounds, and the cost of production 36 cents per pound, allowing an increase of lambs equal to 25 per cent. on the whole flock, which is not far from correct, as every large flock must necessarily be made up of bucks, wethers, ewes that are too young to wean, as well as breeding ewes; and the number of lambs to breeding ewes, with fair keeping and attention, will be annually about 80 per cent. A ton of good hay, or its equivalent, will produce 12 pounds of wool in a washed or marketable condition of the merino blood; but whether this would be a fair computation with the coarse or long-woolled sheep, I am unable to say, as I have had no experience in these breeds. I have answered but three or four of your inquiries, and have confined my attention to those in which I have had some experience, and believe, in the main, that they are correct.

With high respect, your obedient servant,

J. W. COLBURN.

WEST WESTMINSTER, WINDHAM CO., VERMONT.

SIR:—It gives me much pleasure to add my testimony in favor of the great good that is resulting to the farming interest by the circulation of the Annual Agricultural Report of the Patent Office. Every farmer in the country has reason to rejoice that government has so far interested itself in the advancement of agricultural science; and farmers, true to human nature, having received favors, will be prone to ask for a continuance of the same. Among other desirable objects, I would suggest the propriety and reasonableness of asking of government an appropriation for the improvement of our breeds of domestic animals. In consideration of the great increase of agricultural wealth that would result therefrom, would it be unreasonable to ask for an appropriation for establishing a *stock farm*? Would not such an institution, under the care and management of government, be of much present and prospective advantage to our country? Surely, with our representatives in every country on the globe, and our national vessels on every sea, it has advantages for making selections of improved breeds of animals which private individuals could not command. And, indeed, a farm of this kind need not be a tax upon the treasury. It would soon become a paying institution. Having made selections of the best animals in our own country, and also foreign countries, and placed them under the care of competent individuals, a still further and progressive improvement might be anticipated by skilful breeding. We could confidently resort to such a farm for breeding animals, and would readily pay remunerating prices for all the surplus stock. It is true we have many good breeders, who, by their skilful management, will effect much in their lifetime; but man dies, and at his decease this progressive improvement in his stock is usually arrested; but government continues through all time. Under its fostering care we might confidently anticipate, for centuries to come, a continued approach

towards perfection in our breeds of domestic animals. We should not want for precedents in such a case. Spain, France, and other continental governments have done, and are now doing, much for their agriculturists by this means. While the Spanish government bestowed its fostering care upon her flocks, she could confidently boast that her's was the "golden fleece;" and millions of dollars would not now compensate her for the loss she sustained in consequence of the dispersion of her standard flocks. The French government is at this time supplying the wool-growing world with an improved merino, the result of seventy years' careful breeding, at prices tenfold remunerating. We are annually paying our thousands to other countries for improved animals which should be bred in our own. If these suggestions are worthy of consideration, we trust they may receive the attention of those who are able to present them more forcibly.

As the raising of sheep and wool has been my favorite employment, I can speak only of it, and regret that I am unable to give exact statistics in answer to the inquiries in this part of the Circular:

"*Is Wool-growing profitable?*"—It has not generally been profitable in Vermont for the last ten years. It costs from $1 25 to $1 50 to keep sheep by the year. The average of wool per head will not much exceed 3 pounds. Our sheep are of the merino, a mixture of merino and Saxony, merino and native, and native breeds. We are fully persuaded that the pure merino is the most profitable variety for our climate. We regard the introduction of the Saxony sheep as a misfortune to our sheep husbandry. However well they may be adapted to other sections, they certainly do not possess a constitution sufficiently hardy to endure our northern climate without more care than most of our farmers are willing to give them. Another consideration which had, perhaps, an equal share in bringing them into disrepute was, that they yielded a fleece so light that it would not pay the cost of keeping. While wool sells for 40 cents per pound, our flocks must produce an average yield of 3 pounds and upwards, or wool-growing will not yield a profit.

"*Cost per pound of growing Coarse or Fine Wool.*"—Notwithstanding the prevalent opinion to the contrary, I am fully persuaded that it costs less to grow fine wool than coarse. My own observation and experience for a number of years past have led me to this conclusion. I keep a flock, varying from 200 to 300, of the merino breed. The average yield ten years ago did not exceed 3½ pounds. Each successive year has given a larger yield.

The clip of 1850 was 4¾ per head, and that for 1851 was a fraction over 5 pounds of well-washed wool, aside from a quarter of a pound of taggings; and during this time there has been a gradual increase in fineness. The wool shorn in 1851 has not been sold. The average price for the four preceding years was 46 cents per pound.

"*How many pounds of Wool will a ton of hay produce?*"—It would be impossible to give anything like an intelligible answer to this question without first establishing certain premises. The kind and condition of hay would make a difference in the result. The mode of feeding would also influence the growth of wool. Thus, a ton of hay might be fed so sparingly that the growth of wool would be next to nothing. Every particle of nutriment would be demanded for the supply of animal heat and the performance of those functions necessary to the maintenance of

vitality. Wool and fat will not increase while the animal is fed with hay sufficient only to keep it in a *breathing condition*. The vigorous demands of vitality will not be compromised; they must first be supplied; and it is only by increasing the food beyond this point that we can hope to realize a profit either in wool, flesh, or fat. It is my opinion that many farmers keep their sheep in such a manner, during the five months of foddering, that the growth of wool during that time is almost arrested, and consequently the hay fed to them is almost lost, or, at best, has only served to maintain vitality.

Again: a ton of hay fed to different breeds would produce an unequal amount of wool. It is our opinion that the merino will give the largest increase for a given amount of food; and here, again, even in the pure merino of different folds, the amount of wool would vary considerably, according as they had been well or badly bred in years past. It is within the observation of every wool-grower, that certain members of his flock will far outstrip their fellows in the yield of wool. Thus, one will shear 3 pounds; while another, of the same live weight, having had the same care and keeping, will shear 5 pounds. Why is this? How can our entire flocks be made to give as good a return as these heavy shearers? These are certainly important questions; and upon a correct solution will depend, in a great measure, the profitableness or unprofitableness of wool-growing.

The farmers of New England cannot successfully compete with those situated more favorably in respect to cheapness of land and mildness of climate, unless they can so improve their flocks that they shall produce an average yield of heavy fleece. In breeding, for the last twelve years, I have sought to establish a flock which would produce the largest growth of wool for the amount of hay consumed. Quantity and quality of wool, with a hardy constitution, have been the leading objects which I have kept in view. The means employed to effect this have been: First, the selection of such bucks as possessed these characteristics in a high degree; second, discarding every ewe that produced either a light fleece or one not of a good grade of fineness; and, third, feeding in such a manner as to develop and maintain in the animal a high degree of vigor. By these means I have been effecting a gradual improvement in my flock, which to myself has been satisfactory.

"*Are large or small Sheep more profitable, either for their mutton or their fleece?*"—Undoubtedly, sheep at maturity require food in proportion to their live weight, and, other things being equal, we may expect about an equal return for the food consumed, whether the animal be large or small. A diminutive size is usually considered an evidence of degeneracy, and is often accompanied with a feeble constitution; hence those of a fair size are usually preferred.

Deficieney of food for a series of years will produce a dwarfish animal; and, on the other hand, liberal feeding will increase the size. Large sheep will of course command a higher price for mutton; and even for breeding, they will command a price higher than their proportional weight would warrant. It will be impossible to combine to a high degree those qualities essential both for mutton and wool in the same animal. In the one it is desirable that the food should be appropriated for the increase of flesh and fat, and in the other for wool.

"*How much more does it cost to produce a pound of Fine Merino than of ordinary Coarse Wool?*"—I have already expressed the opinion that it costs *less* per pound to produce fine merino wool than any other variety, and, where the object is mainly the growth of wool, have given a decided preference for this breed of sheep. With *improved* flocks it can be profitably produced for less than 35 cents per pound.

Allow me to explain the meaning which I attach to *improved flocks*. As before stated, certain members of a fold may be selected which uniformly produce heavy fleeces of fine wool. By judicious breeding for a long series of years, these characteristics may be permanently fixed upon the entire flock. There will be a development of vital activity in the millions of wool follicles of the skin. Every particle of food containing the elements of wool will be assimilated in such a manner as to increase its growth.* Such animals, properly fed, will invariably produce a large amount of wool, and their offspring will uniformly maintain like desirable qualities. The conformation of the coarser-woolled breeds is such, that the food is assimilated more for the increase of flesh and fat; and until these shall command a higher price than fine wool, we believe the merino will make the better return for the food consumed.

In this connexion I take the liberty to state some general impressions in regard to sheep husbandry, derived from a recent tour through some portions of Europe. Previous to sailing, I visited Hon. William Jarvis, of Weathersfield, Vermont, who had, some forty years ago, made large importations of the Spanish merino.

Mr. Jarvis is now upwards of four-score years; but, when I had made known to him my intention of visiting Spain, he seemed at once to regain his former activity, and entered into the subject with as much ardor as a man in the meridian of life. He felt confident that as good sheep might be found now, in Spain, as formerly, and gave the location where they could be found. Mr. J.'s former importations have done immense good to the sheep and general interests of the country, and every wool-grower owes him a debt of gratitude.

Landed at Havre on the 22d of February, 1851; and at Paris I fortunately fell in company with Wm. R. Sanford, esq., of this State, who was also in pursuit of sheep, and we accordingly made our arrangements to travel in company together. We proceeded immediately to Rambouillet, about forty miles distant from Paris, and examined this and other flocks in the vicinity. Here I would say that the ordinary sheep in France are inferior to our own, and that, so far as we could learn, there were but few flocks that could be relied upon for purity of blood. We had formed a favorable opinion of the French merino from previous importations; but, upon seeing them at home, in the entire flocks, we were still more favorably impressed with their good qualities. The flocks presented to our mind a striking instance of the improvements that could be effected by skilful breeding. It is a pleasure for those who can admire a noble animal to look upon their well-proportioned forms. They certainly seemed to possess a combination of those qualities most desira-

[* The remark, "Every particle of food containing the elements of wool will be assimilated in such a manner as to increase its growth," needs some qualification. Only a part, and that the smaller one, of the elements of wool contained in the food of sheep goes to form that substance, under the most favorable circumstances. The communication of Mr. Campbell is so full of instruction and valuable suggestions, that a small error from him will do more harm than from one of less authority, if uncorrected.]

ble in a breed of sheep—a combination adapted both to the production of mutton and of wool.

The compactness of the fleece, the growth of wool over the entire surface of the body, and a good degree of fineness, were sufficient evidence that they were well suited for wool growing purposes; and they also possessed the size and quietness of habit desirable in a mutton sheep. We made purchases mostly from M. Cugnot's field.

After having summered and partly wintered a number of these French merinos, my good opinion of them has not diminished, but rather increased. It was the opinion of many that they would not thrive well on the keeping which we ordinarily give our old breeds, but I was able to satisfy them that such a conclusion was not correct. As we were obliged to feed mostly on grain during the voyage, I gave them a quantity daily until shearing time, after which the eighty ewes did not eat a bushel of grain until past the middle of September. In consequence of the drought, the feed became short, and they were fed daily with oats to make up the deficiency. The sheep throve remarkably well, even better than some of our old breeds would have done with like keeping.

They are now (December 25) dropping their lambs, which are unusually strong and healthy.

Fifteen ewe-lambs, brought over at the same time, were turned off to pasture and exposed to all the storms during the season. They came in looking remarkably well. I feel confident that we have no hardier race of fine-woolled sheep in the country. The following is the result of their shearing: Average live weight of ewes, 103 pounds; average weight of fleece unwashed, 12 pounds 8 ounces—making the proportion of wool to live weight as 1 is to $8\frac{2}{10}$. The lambs five months old, although they suffered much from the voyage, gave an average of 3 pounds 8 ounces.

We now concluded to visit Spain, although we had derived from various sources information which led us to the conclusion that we should not find such sheep as we were in pursuit of. Our minister at Madrid rendered us valuable assistance in obtaining information in regard to the location where the best sheep could be found. After examining the most noted flocks in Estremadura and other parts, we were fully satisfied that they were inferior to most of the improved flocks in our country. The sheep in Spain have evidently been degenerating for the last forty years. We next directed our journey through the German States. Fortunately, our excellent consul at Stutgard, C. O. Fleischmann, was intimately acquained with the sheep husbandry of the country, and was able to render us valuable assistance After travelling through the most noted wool-growing districts, and examining the sheep of those folds which had attained the highest reputation, we were forced to the conclusion that they were not adapted to the wants of the wool-growers in the United States; at least not to those in the more northern States. They were mostly of the Saxon variety; their fleeces light, with an organization which denoted a slender constitution. We saw many things worthy of imitation in the management of their flocks, and can freely award to them the praise of having perfected, to a high degree, the science of sheep husbandry. They have attained, in their breeding, just the animal sought for; but, as above stated, the lightness of its fleece, and the delicacy of its constitution, render it objectionable to the generality of wool-growers in this country. We found in some flocks more of the characteristics of the merino; but, as yet, had been unable to find any

that combined all the desirable qualities of the breed. We continued our travels through Silesia, where we fortunately found a flock that presented the desirable points of the highly improved merino. They were selected in Spain in 1814, and had been bred with much care since that time by a truly scientific breeder, who had greatly improved upon the original stock. These sheep possessed that sameness and uniformity of appearance, which denote purity of blood. They retained a remarkable degree of evenness of staple over the entire body, and were finer and more compact, especially on the belly, than any sheep that we have seen. The surface presented a dark appearance, and on opening disclosed a beautifully-white oily wool. They were of fair size, well formed, and seemed to possess good constitutions. As an evidence of their longevity, we noticed in the fold, enclosed in a glass case, the stuffed skin of a venerable looking ewe, which had yielded a valuable fleece for 21 years, and presented, with artificial eyes, quite a life-like appearance. After close confinement on a long voyage, 19 ewes from this flock produced 145 pounds 7 ounces of unwashed wool of 10 months' growth, which would be equal to 175 pounds for 12 months, and would make the yearly average a fraction over 9 pounds. The average live weight was 71 pounds; but when fully grown, would be from 80 to 90 pounds. The produce of wool to live weight would be as 1 to $7\frac{9}{10}$. It may not be improper to state that the wool was in a perfectly natural state, no oil or coloring matter having been applied. They certainly possess naturally such qualities as are sufficient to satisfy the most devout admirer of them.

The proportion of lambs reared varies greatly in different years. Last year there was a large fatality among those dropped after the ewes were turned to pasture. It is believed that the little sugar maples eaten by the ewes previous to lambing produce a deleterious effect upon the lambs. Some lost upwards of fifty per cent. from this cause. The ordinary loss I should estimate as high as fifteen per cent.; but even this can be avoided by a proper previous feeding and careful attention during the lambing season. There is no reason in nature why there should be a greater mortality than with colts or calves; and an explanation of this ordinary mortality may usually be found in the feeble condition of the ewes, induced by scanty food and exposure. Let them be fed during pregnancy in such a manner as to keep up a good degree of vigor, and the loss will be less than five per cent. But here, lest I should be misunderstood, let me protest against feeding breeding animals, either male or female, too high. Our ordinary sheep have little occasion of fear from this treatment. It is our valuable animals that suffer most from this cause. An excessive accumulation of fat will surely cause degeneracy in the offspring, aside from the danger of greater immediate mortality. A gentleman of our State, the present winter, has lost eleven out of nineteen lambs from excessive fat—French ewes; and it is, to my mind, an occasion of regret, that many of our best animals are suffering from this cause. True, an excessively fat animal "fills the eye," and will often, on this account, command a much higher price, which induces the owner to adopt this course. An inexperienced breeder will often be deceived in this matter, and pay for such animals a price far beyond their true value.

I am, very respectfully, yours,

GEORGE CAMPBELL.

Hon. Thomas Ewbank, *Commissioner of Patents.*

MASSACHUSETTS.

WORCESTER, MASSACHUSETTS,
December 19, 1851.

SIR: The Agricultural Circular from the Patent Office, containing questions to be answered, has been for some time on my table. As most of the questions applicable to this section of the country have been so fully answered, I shall confine my notice to one only—that of *manures*.

My own opinion of the "best plan of preserving manure from waste" is to keep it under cover, secure from washing and evaporation, and when wanted for use, to be carted to the field for which it is intended, and immediately spread and covered by the plough. By this method, all the gases are secured in the earth without waste; but much loss is sustained by those who compost their manure; the most valuable parts pass off to vitiate the air, not to enrich the earth.

Plaster is profitably used as a fertilizer, particularly on grass lands. Our hill lands are much benefited by it, especially if the soil is of a clayey loam. The quantity used is commonly one bushel per acre, sowed on the land in the spring of the year, and is often repeated each year, for several years in succession, with beneficial results. The effects from the use of plaster are much more obvious some years than others. On some land, and in some seasons, the evidence of the benefit from the use of plaster will be strongly marked the first season. At other times, the benefit will be but little apparent the first season, but quite obvious the second and third years. Whether this difference is occasioned by a difference in the climate, or in a greater or less degree of moisture in the atmosphere, I know not. Plaster is also profitably used in being scattered upon the barn-floor where cattle are kept, to take up and retain the ammonia arising from their excrements; and for the same purpose it is scattered over the manure-heap, and adds much to its fertilizing properties. Since the potato rot has been so prevalent, that root is not now planted on manure in the hill, as was the former practice. The usual course now is to plant the potato without manure, except what may have been spread and ploughed under, and frequently without any. After the potato vines have appeared above ground one or two inches, a small quantity of plaster is thrown upon the vines, which has been found greatly to improve the crop of potatoes.

There is another fertilizer which I think much more of than any other—I mean that of *water*. I have practised irrigation for more than 30 years, and I know of no means by which land can be improved so certainly and so cheaply as by water, where it can easily be obtained.

I have on my farm a copious spring; it is situated on the side of a hill, within a few feet of the spot where the water is discharged from the earth. I have made a ditch, but little descending in its course, on the side of the hill; turned the water into the ditch, and use it in irrigating the land. The quantity is sufficient for watering some two acres, and the result has been highly beneficial. The water from this spring is, however, much less favorable for irrigation—being in the state of purity in which it issues from the earth—than the water of streams as usually found on farms, which are much enriched by that which has passed into the water, either from the surface or the material over which it has passed, and will afford the best nourishment to grass, not merely by the moisture, but more by

that with which the water is charged. Much of the richest portion of our soil is washed away by the rains, and carried by the water from the land, to be deposited in the beds of streams, in the bottom of mill-ponds, or in the ocean, where it can be of no use to the farmer. Much of this may be saved by irrigation. Turn the water over grass land, and the water will be strained, depositing its richness on the land, and be returned to the stream in a pure state.

On most farms situated in part on a side hill there are usually one or more streams of water descending from the higher parts of the hill to the valley below; although they may not be lasting, they usually continue from the early part of the spring until about the first of June, and sometimes longer. All such streams may very profitably be used in irrigation. I have on my farm a run of waters so situated, and use it most profitably on what is called the catch-work plan of irrigation; and, although the supply of water fails earlier in the season than I could wish, yet I have the benefit of it until I have secured a thick growth of grass, sufficient to secure the land in a great degree from the effects of a drought, should one occur before haying, and thereby make sure of a greater grass crop than I could otherwise have obtained. The expense attending this improvement is very inconsiderable. An intelligent man, with one to assist him, with the aid of a level, will in a short time stake out the course of his ditch on the side of the hill, giving a slight descent from the place of taking in the water in the direction it is to run—1 inch in 10 feet is sufficient; then, with a team and plough, turn the land from stake to stake, which should be at short distances, to made the ditch more perfect down hill. It will be desirable to take two furrows in the same direction. The ditch is then easily finished with a hoe. After one ditch is made, another, some 20 or 30 feet from it farther down the hill, may be made to receive the water flowing over from the first, and again distribute it equally for use, and so continuing to the bottom of the hill. When the water is admitted into the ditch, which should be formed so that the water would trickle over its banks for its whole length, it will, from the inequality of the land, soon form itself into little rills; thence the necessity of a second ditch for another equal distribution. There are frequently on these side hills hollows, and places where a dam may be made at a small expense; and a reservoir may be formed for the retaining and better controlling the water, which will add greatly to the benefits that may be secured from this improvement. I have known land watered in this manner to produce as large a crop of grass as could be dried on the ground, for many years in succession, having no manure except that which it obtained from the water, and from the dropping of the cattle when feeding off the after feed. This land has since passed into other hands; the use of the water has been discontinued, and the crop of grass is comparatively very small—not one quarter what it was formerly. The cost of this kind of irrigation is usually very small, generally less than the value of the improvement for a single year.*

There are commonly, on the sides of every stream, quantities of land which may be irrigated to great advantage. For the purpose of taking

[* Irrigation promises more for American agriculture than any other improvement at this time. All, or nearly all, of the water that falls in 12 months on a farm should be retained, to prevent the evils of drought, instead of being allowed to run off in freshets. It can be stored in catches, or numerous reservoirs.]

out the water, a dam would be necessary across the stream, and the expense must depend upon its location; and whether it would be expedient to erect such a dam, would very much depend upon the quantity of land that could be irrigated by its aid. Frequently, by going a little farther up the stream, a slight dam may be sufficient to turn out the water, although it will require a longer ditch to convey the water to the land to be irrigated. The longer the ditch, the larger it should be to convey the proper quantity of water. There is much land where this improvement may profitably be adopted. They who are disposed so to do will find it much to their advantage to employ a person skilled in the use of a level to stake out the work for this improvement. Those who doubt the benefits to be derived from irrigation have not noticed the appearance of the water in a stream after a shower, and observed how much richness it would give to the grass roots by depositing its freight on the land.

My farm is on the bank of Blackstone river, across which I have a slight dam, by which I take out the water and irrigate about 30 acres of land; and on no other land do I get so profitable a crop. It requires much attention, to be continued daily when using the water, in turning it from place to place, that all may alternately be watered, and preventing it from running too long in the same place, which would be attended with injury. If, by the use of water, a drifting sand may be converted into a luxuriant field, how much benefit, then, may be expected when water is applied to a good soil?

The land which I irrigate—except the side hill before mentioned—is principally alluvial land of a sandy soil, and I have uniformly noticed that on that portion which received the most water, I had the longest grass; being always careful not to permit the water to continue on it long at one time.

The use of water has much to commend itself to the favorable regard of those who can use it; it takes nothing from any other part of the farm, but, in its results, yields much for the improvement of other sections of the land. The hay grown on watered land is not so heavy, and may not spend so well as that grown on upland—growing without the aid of so much moisture; but will be greatly *more* in quantity. It may not be so good for a working ox, but is better for a milch cow. I have found no difficulty in keeping my stock through the winter in good order on interval-hay alone, taken from watered lands. It is, however, most expedient, in feeding stock, to change their food occasionally, even if the food is no richer; they keep in better appetite, and appear to relish their food more highly.

Respectfully, yours,

JOHN W. LINCOLN.

RICHMOND, BERKSHIRE COUNTY, MASS.,
January 1, 1852.

DEAR SIR: Your Circular, making inquiries on the progress of rural affairs, is before me. In reply to the queries suggested, permit me to say that *wheat* is not raised in large quantities in this region; but in some parts of the county, fields of ten and a dozen acres may perhaps occa-

sionally be found; more commonly, it is seen in small lots of from 1 to 3 acres; and on a far greater proportion of farms there is none. Where raised, it is, for the most part, of spring varieties, and is usually sown as early as the season will permit, on land well-manured and tilled with corn the previous year. Such land is sown with one ploughing at seed-time, and the more harrowing given to it after sowing, the better for the land and the crop. One of the finest pieces we have ever seen in this region, (producing 37½ bushels per acre,) raised on land reclaimed from pine bushes and mouse ear, we are informed by the cultivator, was harrowed, more or less, for a week from the time of sowing. Though this may seem a harsh operation for the sprouting grain and the tender blade just rising to meet the light, he had much confidence in its benefit, and his crop certainly spoke well of his cultivation. The yield of wheat, under careful management, does not diminish in quantity for the last 10 years; yet it may be considered, in the present condition of the soil, a hazardous crop, and one which, to be successful, must be got in with care, and tended with care. A frequent change of seed from remote localities, produces a surprising effect with wheat. We are fully confident that, if farmers would club and get new seed from places 200 or 300 miles distant once in 4 years, they would more than find the expense and labor compensated. But little complaint is made of insects by the few who grow the crop. Soaking the seed in strong brine and liming previous to sowing, may prevent the work of the Hessian fly; and sowing plaster or lime on the wheat when in blossom, or while the seed is yet soft, we are confident will check the weevil or midge. It should be sown when the grain is moist, or at evening when the dew is beginning to fall, that it may remain upon the grain. No wheat raised for market.

Corn.—We have, in former Reports, stated the average quantities per acre. The cost of raising, of course, varies on different soils and under different management. By taking an exhausted piece of land, and ploughing shallow, and manuring sparingly, and half-tilling the land, and suffering the fodder to be injured by storms, it can easily be made to cost a dollar a bushel. While, by thorough management, deep and thorough ploughing, with such manuring and after-management as every farmer will give if he expects a crop, it can be raised at 50 cents a bushel, and in some localities probably for less. We once heard a neighboring farmer, who has good crops, say it did not cost him six cents a bushel to get his corn. Be that as it may, it is far below the average price of raising. The time of ploughing for corn, and the after-management, are various indeed. Some prefer to plough in autumn; some early in the spring; and others as near the time of planting as possible—always careful, however, to plough deep, and lay the sod beyond the reach of the cultivator. This late ploughing in the spring will, of course, leave the ground in the most lively condition, especially if the soil is inclining to loam.

In the application of manures, practice varies. Those who can afford it allow a portion of their manure to lie over the year, and apply it in the hill. This is certainly very fine food for corn, so rotten and fine. But it is doubted by many whether the shovelful so applied will produce so good an effect as might have been realized by giving the same space the amount that it took to make that shovelful the previous year. Our own opinion is, (and we practise upon it,) that, the sooner manure can be in-

corporated with the soil, the greater benefit will result from it; and, acting upon this principle, our practice is to clean the yard as early in the spring as circumstances will permit; and, if the quantity of manure will warrant, we spread and harrow in until it is buried from the sun's direct influence. If the quantity does not meet our desires, we put it in the hill; at any rate, get it on or within the land as soon as may be.*

By occasionally throwing plaster over the yard and manure heaps during the winter, and keeping them free from litter, beyond the necessary amount for the comfort of animals, the manure in spring will be found good enough for corn or any other crop. In the matter of feeding, our best farmers are coming to the grave, and, we are pretty confident, just conclusion, that it is better to soak their corn, than to grind it, if its nutritive qualities are the same. Two points of economy are gained in this way: first, the time spent in going to mill, which will amount to two or three times for a single grist; and the toll, which those experienced in the matter must know tends to diminution of quantity. How much grain the manure formed by feeding hogs with ten bushels of corn will produce, when applied to the land, I cannot say. By good management and a little help in the way of throwing turf, muck, and other decomposable substances into the hog-yard, one hog will probably make manure for an acre of corn in a year.

Oats, Barley, Rye, Peas, and Beans.—Of these, rye is the least exhausting crop; barley and peas next; and oats, from their being more certain and always in demand, are most raised and most exhausting. I have no knowledge of peas being cultivated as a renovating crop.

Grasses.—The quantity of hay per acre is various; a ton and a quarter will probably be a full average. The best fertilizer of meadow-lands must, of course, depend upon the soils to be improved. Top-dressings of composted manure are valuable; so is plaster, on lands adapted to clover; so is lime, but the high prices it commands in market will not admit of its general use. Ashes are valuable, though they may, with propriety, be incorporated with the compost heap, to be carted on to the land and spread immediately after the crop is taken off. Clover and timothy are the grasses most commonly cultivated in meadows; though with these many are now introducing red-top, which is a fine and a more solid grass. The quantity of grass seed sown to an acre differs according to the dictates of the farmer's liberality and supposed ability; for some have still the idea that it is an expense—which they cannot, in economy, meet—to buy much grass seed; and a little, until they get more able, will do very well.

The advantages of thorough-stocking are, we are happy to say, being more and more appreciated; and, we presume, there are but few farmers who think of sowing less than a peck of timothy and clover on an acre; and when red-top is added, we presume the dose is fully doubled; at any rate, the quantities we have named are small enough.

Tobacco.—It has formerly been supposed that our soil was too hard, and our climate too cold, for the cultivation of this crop; but some few experiments, made on a small scale, in different sections of the county, the

[* This is a good practice. One cannot place the droppings of animals in the soil too soon after they are voided. Keeping manure in yards never adds to the aggregate amount of its fertilizing atoms; on the contrary, there is great danger of loss being sustained.]

last season—which was cool and late—may well lead us to suppose that, with proper attention, its cultivation may be attended with desirable success. The specimens we saw gave a large, thin leaf, such as could be easily cured, and we should think would command a quick market.

Potatoes.—We had fond expectations—the early part of the season was so wet, and it was so cool throughout—that the country would be blessed with an old-fashioned potato crop; but, though the produce of sound potatoes was an improvement on that of former years, yet it was not entire. But very little was seen or heard of the rot until the 23d of August, when more rain fell than we had all the six weeks previous. Immediately after this rain, we heard complaints of the rot, which, as usual, prevailed most where fermenting manures were applied. How far its effects would have been felt if potatoes had been permitted to remain in the ground, we cannot, of course, say; for many fields were soon dug, and the experiment with them ended, so far as rotting out-doors was concerned. We think this will be overcome, and that the potato will yet be reinstated as a reliable crop; and, in order to gather some conclusions satisfactory to ourselves, we entered upon the following plan of cultivation, to wit: We planted the few we raised at five different periods, and in five different patches; first, we planted early potatoes early in May, on sward-land turned over in April; land, light loam on limestone, no manure and no rot; crop good for late years, fair for years of potato-raising. Second, we planted a few rows on land where potatoes were grown in 1850, on a loam inclining to clay, limestone bottom; these were planted early in May, without manure; result last of September, about one-tenth slightly affected with rot. Third, planted peach-blows around the corn-field, May 10; soil as before, on a stiff sub-soil; no manure; result in October, near the 20th, on the sides where the ground was trod down by the team in turning to plough, a few rotten potatoes were found; on other sides of the field, none; crop fair. Fourth, turned over a small piece of meadow very late in May: soil clayey loam, based on limestone; land harrowed and planted, without manure, the same day it was ploughed; crop hoed once, about half of it immediately after a shower; result in October, crop very fair of good-sized potatoes, and no rot. Fifth, turned over a small piece of sward in June; soil black loam, inclining to muck; no manure applied; harvested in October; potatoes large, well flavored, and no rot.

Such is the result of our experience with the potato crop the last year. While we permit others to draw such inferences as they see fit, the following claim our own attention: First, that it is not early planting nor late planting that mitigates the disease; at least in our case it made no difference. Second, fermenting manures, if they do not cause the disease, are auxiliary to it. We infer this from the fact that our neighbors who used such manures, on soils as favorable as our own, suffered much; while in former years we should not have thought of potato rot from any that existed among ours. Third, that open porous soils are more congenial to the potato than compact ones, or that the tendency of the disease is increased in the latter. This we learn from the fact that, on the hard-trodden headlands, a tendency to the disease was manifest; while in the same field, and in the same soil, lying light and friable, no such tendency existed. Fourth, this disease is not the result of the potatoes running out; those that were fairest, largest, best, and showing no indication of rot, were a

variety which has been cultivated on the farm without change of seed (not a very good plan we admit) for a quarter of a century, and promise to hold out for size and quality for half a century more; while all appearances of rot were in those of recent introduction. In conclusion, is it not possible, after all, that this disease is owing, to a great extent, to the cultivation, rather than a visitation of Providence, or the depredations of bugs and worms, that fed, unblamed, upon the foliage before the disease was known? Who knows but the effect of thorough drainage and subsoiling, and the use of other than fermenting manures—straw, or clover, or buckwheat, ploughed in—would have the effect to do away with the evil? We do not; and if any one is otherwise enlightened on the subject, let him speak.

There is increasing attention paid to the culture of *fruit*, to which our soil and climate are admirably adapted. Probably the number of apple trees set the last season has increased in at least a six-fold proportion over those set in any former year. It is but reasonable to suppose that at least one-half of these, through want of care in setting and after-management, will fail of coming to maturity. While valuable fruits are doing as well in market as they are now, (good varieties of apples being worth, at the time of gathering, from 50 to 62 cents per bushel at home,) there can be no mistake but that their culture will be a profitable business, probably the best in which the farmer can engage. Let no one venture upon it, however, without thinking that, like all productive employments, it requires labor and watching. In the first place, good trees must be well set in carefully-prepared soil, and then frequent watchings must see that the soil is kept loose around the roots, and that these are carefully fed with proper food. A fruit tree cannot, and ought not, to grow in cramped and starving circumstances, and they must be kept free from worms and other insects, which, if allowed to prey upon them, will first disfigure and then destroy them. We will suppose the cost of an apple tree, when set, to be one dollar—that is, eighteen cents for the tree, and the remaining eighty-two cents for digging the hole, preparing compost to place around the roots, and setting the tree; then add fifty cents a year for digging about it, pruning, and protecting from insects; at the end of ten years the tree has come into vigorous bearing, and the cost, exclusive of ground rent, which is paid by the increase of other crops, is $5 50. Eleven bushels of apples will pay for this; and the tree, if it has done well, has more than given this. From that time, then, there is an increase of profit without increase of labor. We have spoken of good trees, well set and well cared for, and know of no rule by which to estimate the profit of a stinted tree, stuck in the ground with a firm subsoil touching its roots, as though the cultivator was afraid they would run through and come out the other side, pruned by cattle and defoliated by worms. Disappointment and sorrow must be the reward of such cultivation.

The Baldwins, northern spies, pippins, seek-no-furthers, greenings, swaars, and Spitzenbergs, with other varieties, are all apparently at home in all the region about us. We know of no remedy for blight but thorough, deep cultivation. Plums, peaches, pears, and cherries produced well last season, and we see no object in the way of their successful cultivation. The best method of transplanting is to dig a very large, deep hole—say from four to six feet in diameter, and two feet deep—to receive the roots; if this is done six months before transplanting, to let

the air operate on the sides and bottom, no harm will follow. Set the tree carefully, with its roots extended, at its former depth; cover them with rich earth or compost; throw the turf taken out of the hole around the sides, towards the bottom, where they will feed the roots; and if you throw hard pan or stiff soil, lay it on top, where the roots will not approach it, and the atmosphere will work it into good, friable soil.

Trees may be successfully set in spring or autumn. If set one year from the graft, a better proportion of root to the top will be obtained, and the growth will be subject to less stint. But be sure to keep cattle from them.

In the matter of *forest culture*, very little more is done than to preserve the wood lots. Farmers are beginning to see the importance of doing so much for the benefit of future years. It is now generally conceded by all intelligent and observing men, we believe, that the most economical method of managing woodlands is, to commence on a remote part and cut clean. This will save much in breaking down young timber, compared with the old and wasteful system of cutting a tree here and another there, which will each, from necessity, break down a younger growth in its fall, and each tree will also require a separate path to remove it. Where this mode is practised, it is not unusual to see patches of pasturage springing up, and but little prospect of a healthy aftergrowth of timber. By this thinning, too, the remaining trees are left more exposed to the winds, which, having full play, subject them to premature decay. By cutting clean, a young and thrifty growth is encouraged over all the land; the old paths are lost in it, and of course the waste of land in wood-paths is each year, as the labor is brought nearer home, diminished. Woodlands managed in this way may be renewed in from fifteen to twenty-five years, according to the location.

The practice of pasturing forests, which once prevailed, is fatal in its tendency, and by all good managers is nearly abandoned; neither sheep nor cattle are permitted to run in such grounds, unless the owner is willing to see his prospects of timber and fuel run out.

Meteorology.—1851 was decidedly a cold year; the lowest temperature was 17° below zero, in February; the warmest, two weeks in the early part of July, when we had summer heat, and aside from which we had very few warm days. Rains were abundant until the 10th of July; but from that time forward a drought followed, and the springs and streams were unusually low. The middle of November, corn suffered from the cold season; oats, spring wheat, &c., from the drought. Hay was good; and, taking all crops into account, they may be said to have been more than middling.

Yours, truly,

W. BACON.

RHODE ISLAND.

MIDDLETOWN, NEWPORT CO., RHODE ISLAND.

Answers to the questions in relation to crops cultivated in this vicinity, stock, &c.:

Corn.—Guano is scarcely used; average product—say 40 bushels per acre; difficult to ascertain the cost of production; not considered a remu-

nerating crop unless the price is nearly or quite $1 per bushel. The best mode of culture is to cover with a good coat of manure to plough in; and, after being well ploughed, to cover with another good coat of manure, and harrow well before planting, and keep clear of weeds by thorough cultivating and hoeing.

Oats.—Average yield—say 40 bushels per acre; 3 to 4 bushels of seed used.

Barley.—Not as much cultivated as formerly, and less productive. Three bushels seed generally used; perhaps 30 bushels per acre would be as much as an average now; though, formerly, 50 would sometimes be harvested from an acre. Considered less exhausting than oats.

Rye.—Not much cultivated; less than formerly; perhaps 25 bushels would be a fair average; 1 bushel seed used per acre.

Grass.—Unless the hay yields about a ton to the acre, it is called small. Sometimes 3 tons have been obtained. Nearly or quite all kinds of manure are good for meadow or pasture. Clover, timothy, or herds-grass, with red-top or border-grass seed, generally sown; and about 1 bushel of the mixture per acre generally, varying according to soil, &c.

Horses.—A few only raised; and when they prove well, barely pay the cost of raising; break young and use moderate.

Sheep and Wool.—Wool-growing would hardly pay were it not for the mutton and lamb for the market; middle-sized sheep are preferred. A pound of fine wool may, perhaps, be raised at as little cost as coarse; but the coarser kinds are in general preferred for mutton and lamb for the market. About as many lambs generally raised as there are ewes kept, and sometimes more.

Hogs.—Not much done in raising pork, more than for home consumption.

Root Crops.—The cultivation of these is believed to be on the increase. Make the land rich, and pulverize well before planting. Average yield, perhaps, 500 bushels per acre.

Potatoes.—Used to produce well, but latterly hardly pay for the labor, owing to the blight, which, if accounted for at all, I believe must be atmospherical.

DAVID BUFFUM.

CONNECTICUT.

BROOKLYN, WINDHAM COUNTY, CT.,
January 6, 1852.

SIR: Your Circular to the president of the Brooklyn Farmers' Club was duly received through the politeness of the Hon. R. S. Baldwin, and we return an answer at the earliest time since a thorough discussion of the various questions.

Corn is the most important crop of grain raised in this town, as our farmers are mostly dependent upon it for fattening their pork. It is ground with oats or rye and barley, and fed in a raw state. Hogs will do better in this way, upon a given quantity, than when cooked.

Our best crops are raised upon green-sward, ploughed 7 inches deep, a few days before planting, which takes place from the 5th to the 25th

of May; manured in the hill with a compost from the hog pen—long manure and summer manure. Long manure is ploughed in too sparingly. Ground thoroughly manured, marked into rows three and a half feet apart each way, with six kernels in a hill, which are thinned out at the second time of hoeing to four; the ground kept as nearly level as possible at each time of hoeing. Eight rowed Canada most in use. Cost of production 50 cents per bushel, with, upon an average, 75 cents per bushel.

Oats are raised in considerable quantities upon ground planted with corn or potatoes the year previous, at an average of 30 bushels per acre, two and three-fourths bushels sown per acre, and will yield more and better than when sown in larger quantities, leaving room for the stalk to branch out and head better. On ground planted with potatoes, straw rusty, short, and miserable.

Barley is raised in less quantities than heretofore, from the uncertainty of the crop, but makes a valuable feed for hogs and cattle ground with corn.

Rye is almost indispensable in the manufacture of "brown bread," and the straw for bedding for horses and hogs little raised. Yields 10 bushels per acre; worth five Yankee shillings per bushel, and is considered a less exhausting crop than oats or barley.

Grass.—The yield of hay has been 25 per cent. greater for the last two seasons than for a number of years of previous, owing to the frequent rains in the months of June and July. Clover, timothy, and red-top are sown together with oats and barley. Ten pounds of clover, 8 quarts of timothy, and 16 quarts of red-top are seed enough for any land, and less should be used when in a high state of cultivation.

Clover predominates the first year, and, fed to calves till the middle of June, if likely to grow too large, yields 2 tons per acre. Should be cut, and, when the water and dew are dried out, made into small tumbles, and stand three or four days; if the weather is good, it may then be carted into the barn without the loss of time, and as bright as when cut with the scythe; making a saving of 50 per cent. over the old method of curing.

Timothy and red-top are cut the succeeding year, at an average of 1½ ton per acre for four or five years; worth $12 per ton at the barn, at a cost of $4 50 per ton. This is the most profitable crop raised in this town.

Our best fertilizer for meadows is long manure, spread early in the month of May, and dragged with a pair of horses or oxen attached to a bush. The particles are thus beaten to pieces, and, when done a short time before a storm, readily absorbed.

Plaster is used with good success upon red loam, 1½ bushel sown per acre in April. In some instances the quantity of feed and grass is increased 25 per cent. The same results are noticed on corn and potatoes. Cost $7 per ton at our mills.

Dairy Husbandry is receiving particular attention. But few of the pure-blooded Durhams and Ayrshires are kept by us. Some have crossed with them without much success. Our best cows are the native breeds; 250 pounds cheese and 15 pounds butter, or 120 pounds butter alone, are an average for our best dairies. Cheese worth $7 50 per cwt., and butter 20 cents per pound. Calves are readily sold at 7

cents per pound; which make the whole product per cow at about $28 per season.

Neat Cattle.—The raising of stock is very expensive; whence the high price of veal, butter, and cheese. Suitable calves for raising are worth $7 at five weeks of age. The cost of summering at $3, and wintering at $8, the two subsequent years at $12 each, make a cost of $42 per head—worth $30. This accounts for the large numbers that are yearly brought into the State from Vermont and Maine, where the hills are more productive and hay cheaper.

Good dairy cows are worth $35 in the spring; in the fall, $20. *Steers* are readily broken by yoking them young, before they are unmanageable; worked lightly with other cattle till they are subdued.

Hogs have been crossed in so many different ways that a Philadelphia lawyer, with their genealogy before him, could not give them any other name than *hog*. We have had the Berkshires and Mackays, and the Suffolks are now having their turn. Their meat is of excellent flavor; but they are too small for the farmers to raise for profit; great quantities are fattened yearly. Lots of 15 and 25 average 450 pounds, and 500 in extra cases; worth this season $7 50 per cwt in the hog. The cheapness of fattening depends on the way they are kept. If kept growing till slaughtered, at 10 months of age, 100 pounds of corn will make 24 pounds of pork, or a dressed hog of 350 pounds; while the half-starved one of 18 months will consume 40 bushels, and not weigh more than 400 pounds.

Potatoes.—The average yield 100 bushels per acre, upon ground that 10 years ago produced 300. The cost of produce may be put at 20 cents. They should be planted upon light, friable soil, near the top of the ground, the manure ploughed in. The peach-blows, Vermont whites, and long-reds are least affected by disease, and yield best. The two first kinds good for eating; worth 50 cents per bushel.

The cultivation of *fruit* received a new impetus by the establishment of a nursery, on a large scale, in this town, by the Messrs. Dyer, some 8 or 10 years ago, where the finest of trees, unsurpassed by any in New England for beauty or quality, are found; many orchards in this vicinity, of 4 or 5 acres, yielding a net profit of $500 per annum. Sweet apples are worth their weight in potatoes for cattle or hogs; but sour ones should be cooked to destroy the acid; they then make an excellent and cheap food by adding a little meal for wintered hogs.

The Roxbury russet, Baldwin, and Rhode Island greening bring the highest prices in market, and will keep the best. They should be picked from the trees about the 1st of October, spread one foot thick upon a barn-floor, with a free circulation of air through. In this way they are dried and shrunk. They should then be carefully put in barrels, and headed up. Stand in a cool place till put into the cellar; removed from the walls in this way, they keep till July. Good varieties sell readily at $2 per barrel in the fall.

Farmers are turning their attention to the making and preservation of manure. New barns are built, with cellars under them, when possible. Yards are filled with loam, refuse hay, and corn fodder.

Guano has been used with the best success, but in limited quantities, owing to the high price. Poudrette is used with good success on light soils, and is considered by some to be a cheap manure at $2 per barrel.

Your plea in behalf of agriculture is read with a lively interest, and the necessity of the establishment of a Bureau at the seat of government, to provide for agricultural schools and lectures, has long engrossed the attention of our most intelligent farmers.

The Report from the Patent Office is eagerly sought after, and read; but falls into the hands of but few who live by the sweat of their brow.

Respectfully, yours,

ALBERT DAY,
JOHN GALLUP, 2d,
EDWIN SCARBOROUGH.

THOMAS EWBANK, Esq.,
Commissioner of Patents.

TOLLAND COUNTY, CONN., *January* 19, 1852.

SIR: Having received your Agricultural Circular through the hands of my friend, L. P. Waldo, Esq., I reply in brief to such of your inquiries as I am able.

Wheat cannot be made a profitable crop with us.

Corn is one of our staple crops, and is more extensively cultivated in this section of country than any other grain, except, perhaps, oats. Guano is not used to any extent. The average produce of corn ranges from 25 to 40 bushels per acre in this region. Some experimenting farmers have obtained as high as 80 bushels shelled corn per acre. I think there has been a decided improvement in the manner of cultivating this crop within the last 25 years, and that the average product per acre has doubled during that time.

The method of cultivating varies with different individuals. The general practice, I should think, is to select a grass plot which has been mowed 3 or 4 years; turn it over well with a good plough; then spread on from 20 to 30 loads of stable or barn-yard manure per acre, and immediately incorporate it with the soil by harrowing the surface thoroughly, without disturbing the sod beneath. This should be done just before the time of planting; then mark off into rows, about 3 feet apart each way, and plant without further preparation. Four stalks are usually left standing in each hill. Most farmers, at the time of planting, put into the hill a shovelful of fine manure, or some other fertilizing substance, to give the corn a start. As soon as the corn is up sufficiently, a horse and cultivator pass between the rows each way; after which men, with hoes, finish the weeding. Two more hoeings finish the cultivation of the crop. When the kernels become glazed, the crop is cut up close to the ground and put into small shocks to ripen. The practice here is to earth up round the hills at the last hoeing. The land generally being rather moist, the crop is not generally injured by drought. In dry and sandy soils a level cultivation is recommended. Pursuing this method in my own practice, I have usually obtained from 40 to 60 bushels per acre. I have made no estimate of the cost of cultivation.

In harvesting, the poor corn is sorted out, and usually fed, in a raw state, either to fattening cattle or hogs, and the good corn is ground before feeding; for neat cattle and horses, it is ground with the cob; for

hogs, it is shelled and mixed, usually with oats, buckwheat, or some other grain, before grinding.

The farmers have learned to set a high value upon the manure made in their hog yards. But in this section we are all farmers only in a small way, and but few keep more than from 2 to 4 hogs. I think, usually, the quantity of manure to each swine fatted would be from 3 to 5 cart-loads, of 50 square feet each. This is done by supplying the yards with weeds, turf, and other substances.

Sheep.—Two years ago I had 14 ewes and 1 buck; sold 14 lambs on the first day of July for $32; sheared 45 pounds wool, worth 34 cents per pound. Last year had 14 ewes and 1 buck; raised 13 lambs; sold 9 lambs for $20; 40 pounds wool, worth 34 cents per pound. I retained 4 ewe-lambs to replenish my flocks. I usually feed a small quantity of grain daily to my sheep during the winter. I think it does not cost me over $1 per head per annum to keep my sheep, including the grain; so you see that they have been profitable; but I have had very good luck for three years past in raising lambs, and early lambs have sold very well. I think that the above, after all, should be considered as an exception, rather than a general rule.

Hogs are kept generally, and, though of the native breeds, much pains have been taken to select the best to breed from, and I think we have a kind that will compare favorably with any in the country. Great weight and early maturity have been the objects aimed at. The color is white almost universally. At from 16 to 18 months old they usually weigh, dressed, from 400 to 600 pounds. A large portion of the farmers fat them the first year; and pigs from 6 to 10 months old weigh, when dressed, from 200 to 400 pounds. A spirit of rivalry has grown up in this region on this subject within a few years past, the tendency of which has been to secure the best breeds, and, in my opinion, to double the weight.

The farmers and mechanics fat their own pork, and they are generally fed from the products of the garden, and other sources, so promiscuously, that no correct estimate of the cost can well be made.

Tobacco.—Tobacco is raised to some extent in the northwest part of our county, and is said to be a profitable crop. It is not raised in the south part, and I know nothing of its culture.

Root Crops are beginning to be talked of, and are cultivated in some instances; but on this point we are yet in our infancy, and can make no suggestions.

Potatoes have been a staple crop, and were formerly raised somewhat extensively; but of late, since they have been afflicted with the rot, the farmers have been more shy about planting them.

Apples, which were formerly made into cider, are now generally fed to hogs and cattle, taking the place of potatoes for that purpose, and are thought to be about as good.

Fruit Culture has been sadly neglected till within a few years past. People seem to be now waking up to that subject, and have commenced cultivating new varieties, and renovating and improving poor varieties, by grafting and cultivating with an energy which promises well for the future. Fruit, at present prices, is among the most valuable productions of a farm.

Oats.—Oats are cultivated to about the same extent that corn is,

usually following the corn crop when the land is seeded down to grass. The farmers here get the least return for their oat crop, compared with the labor bestowed upon it, of any crop which they raise. The ground is ploughed (if a corn stubble) early in the spring; the oats sown broadcast, three bushels to the acre, and worked in with the cultivator; after which the grass-seed is sown and the land made level with a bush or roller, and the labor is done till harvest. Average crop from 30 to 50 bushels per acre. The harvesting and threshing are but a small job, and the oats are cash, at from 40 to 50 cents per bushel.

Barley, Rye, Peas, and Beans.—These are all cultivated, though not extensively. On the sandy soils in the northwest part of our county, rye is raised more extensively, taking the place of corn. The best farmers usually seed down their land about once in five or six years, sowing from 8 to 10 pounds of clover, and from 6 to 8 quarts of herds-grass seed, per acre; though many get along with a much less quantity, probably to their own disadvantage. In very moist lands the clover seed is dispensed with, and red-top is used in its stead; clover being liable to winter kill on wet land.

Cheese.—No cheese of any account is made. The farmers usually keep from 2 to 8 or 10 cows. All, I believe, make butter wholly, which is generally marketed beforehand, and delivered weekly in some of the contiguous manufacturing villages, principally in Willimantic. Average price through the summer, from 14 to 18 cents per pound; in the winter, from 20 to 30 cents. Produce of each cow per annum varies much—say from 75 to 150 pounds.

Neat Cattle are not raised to any great extent. They can be bought of drovers at two or three years old for less than the cost of raising. Good cows are worth, in the spring, from $20 to $40; in the fall, from $15 to $30. The calves of dairy cows usually go to the butchers at from 4 to 8 weeks old, and are then worth from $3 to $6.

The farmers occasionally fat a yoke of oxen to sell, but no great amount of beef is fatted, except what is needed for home consumption. Good working cattle, from 5 to 8 years old, are worth from $80 to $120 per yoke at the present time, and have been for two or three years past. So you see it is not an object for us to make beef, as *oxen* will not fetch more when fatted than they are now worth to work.

No horses or mules of any account are raised for market. The farmers generally keep one horse to plough out their corn, to go to market, to mill, and to church; and that is about all that is done with the horse kind. Value of horse, usually from $50 to $100.

Yours, truly,

JOHN S. YEOMANS.

To the COMMISSIONER OF PATENTS.

CREAM HILL, WEST CORNWALL,
January 3, 1852.

SIR: I propose to answer, briefly, a few questions introduced in your Circular, confining myself to those relating to grazing and dairy husbandry, as our soil is adapted to those branches of farming.

Grazing.—Our best meadows yield three tons per acre at one cutting, and some farms average more than two tons of hay per acre. But, generally, that would be too high an estimate.

Fresh green manure is employed with advantage as to top-dressing on moist meadows; but, if it contains much straw, it is better to allow it to ferment under shelter, or to compost it with peat or swamp muck, and draw it out in autumn, to be spread in the spring. Fermented manure may be applied in the spring, or in the summer after the grass is cut, or late in the autumn; but green manure seems not serviceable when applied just as the grass is starting into vigorous growth in the spring, which thus keeps the manure moist by its shade, and rapidly appropriates all of its volatile and soluble portions.

Ashes and gypsum are very valuable, and much used as top-dressings; but the former should not be applied with barn-yard manure, as it tends to liberate and dissipate its ammonia; while the latter should always be applied with it, as it will retain the ammonia, which might otherwise escape. If frequently sprinkled in stables and on the manure heap, it must, of course, become fully charged with this gas, which will be given up when needed by plants.

The effect of manure is most distinctly seen on land which is already in good condition, and when the most valuable grasses are firmly established. Most of the land mowed in this region is permanently in grass, and its productiveness does not diminish for any length of time, if properly manured. When land is seeded to lie only a few years in a rotation of grass, red clover and timothy, or herdsgrass, are alone employed, using about two quarts of the former, with six or eight of the latter, per acre. When the land is moist, and it is designed to lie permanently in grass, a half bushel of reed-top seed may be added to advantage. A plentiful supply of seed produces a close turf, which prevents the growth of weeds, and the stems of the grass are finer and more valuable.

With regard to the cost per ton, by referring to my note book, I find that the past year we cut, by estimate, about 200 tons from 85 acres, employing nearly 200 days' work; costing, with board and tools, $1 50 per day. Add to this, interest on the land, at least $3 per acre, and the cost of returning the manure to the land to keep it in good condition, we shall make the cost of the hay in the barn a little over $3 per ton. With a superior crop, contiguous to the barn, and a favorable season, it might cost less than this.

Dairy Husbandry.—The average annual produce of cheese to a cow in this region is about 300 pounds. Where the dairy is large, it is considered most profitable to make no butter except in the spring or fall, while the weather is cool and the quantity of milk small; for it is estimated that every pound of butter takes nearly two pounds from the cheese, besides affecting its quality.

In smaller dairies, the night's milk is skimmed in the morning, and mingled with the new; for the cream, if once separated, cannot again be mixed with the milk; so that all will remain in the cheese, but will pass off in the whey.

It is estimated that the milk which will make 1 pound of butter will make nearly 3 pounds of cheese, although the proportions must vary much at different seasons, depending upon the quality of the milk and the character of the weather.

So many different circumstances must ever affect experiments upon these subjects, that we can never hope to attain that accuracy of result as in many other researches. Among these may be named the difference in cows—the milk of one being rich in butter, and another in cheese; their condition in flesh, the quality of their food, extremes of heat and cold, moisture and drought, and the quietness or excitement of the cow at milking time.

The cheese of this part of Litchfield county is much liked, and is sent to market under the name of *Goshen* cheese. The price this year has been low, yielding the farmers but 6 or $6\frac{1}{2}$ cents per pound. That of butter has raised, during the season, from $12\frac{1}{2}$ to 20 cents.

Neat Cattle.—The average value of cattle, at three years old, is from $25 to $30, and we consider that it costs that to raise them. Good dairy cows are worth, in the spring, from $30 to $50; in the fall, about $10 less.

Steers are usually broken in the yoke when three years old. If stabled and confined in the stanchions, their necks become used to restraint, and they submit to the yoke very readily. The most common practice is to place them, when yoked, between two pairs of older cattle; and in this way they are sufficiently broken to put on the lead. Or they may be put there at first, or even driven alone—a halter being put on one to restrain and guide them. They should be treated very gently and kindly, or they may acquire bad habits, which may prove troublesome. It is important that they should be trained to move quickly, and therefore they should not be checked or overstrained by heavy loads when young. When oxen are worked regularly, especially upon the roads, or in the winter, when there is ice, shoeing becomes almost as necessary as with horses; and it is gratifying to the driver to see with what spirit his team will take hold of their load when well shod, and with what confidence they will go upon the ice. In order to put on the shoes, the smith confines them in a frame built for the purpose.

In a rough and hilly country like New England, the ox is advantageously employed on the farm in preference to the horse. If well trained, and properly fed, he will do nearly as much work, while the expenses of keeping are very much less, and his liability to disease and accident is very small, indeed, as compared with the horse. And, when he is no longer needed for labor, his value for the shambles not only secures a season of rest and enjoyment for himself, but preserves his owner from all danger of loss.

Respectfully, yours,

T. S. GOLD.

NEW MILFORD, (NORTHVILLE POST OFFICE,)
Litchfield County, Ct., November 6, 1851.

DEAR SIR: Your Circular of August, 1851, was duly received through the politeness of the Hon. Truman Smith.

Living in a region of country favorable to agriculture, I have noted, with some interest, the effect of improved cultivation of the lands in this vicinity. Twenty-five years since, much of our plough-lands was ex-

hausted, and presented as forbidding an aspect as does much of the worn-out lands of Maryland and Virginia. By judicious cultivation, these lands have been most completely renovated, and their productiveness and value have been increased from 100 to 500 per cent. The same land which, a few years since, would hardly pay for cultivation, will now produce 60 bushels of corn per acre, and other crops in proportion. Our usual course with worn-out lands is to summer fallow, ploughing to the depth of about five inches; cross-plough early in September, being careful to leave the soil thoroughly pulverized; then spread evenly upon the land from three to six loads of fine manure; sow with rye, and drag with harrow; then sow from six to eight quarts of timothy seed per acre, to be followed by a bush. As soon as danger from severe frosts is past in the spring—say the 20th of April, the ground is sown with clover, at the rate of from two to three quarts of seed per acre, and dragged in with a heavy bush or harrow. This, so far from injuring the rye or timothy, will decidedly improve the crop. The next step is to sow, about the first of May, 100 pounds of Nova Scotia plaster per acre; the plaster being repeated annually, while the ground remains in grass. Lands treated in this way, if not too closely fed, will produce a most luxuriant crop of grass, for three or four years in succession; when the timothy will have formed a thickly-matted turf, so essential to the production of Indian corn. Such land, with a slight manuring, will produce 50 bushels of corn to the acre.

Neat Cattle.—Cost of raising, until three years old, a good anima about $28; which sells for from $28 to $36 and $40; the latter prices for fine-working steers. Much attention is given to selecting and breaking steers, and probably no county in the Union can boast of finer oxen than Litchfield county; many working oxen selling as high as $150 the pair, though the average of good oxen might be set as low as $110 per pair. It is generally conceded that the raising of a poor animal does not pay expenses. There are a variety of opinions as to the most valuable breed of cattle for practical farming purposes. My own observation and experience have led me decidedly to prefer a cross of the Devon and Durham, which unites many of the good qualities of both, without retaining the defects. In answer to your inquiry, as to the best method of breaking steers to the yoke, I will give you my own. Steers are generally matched at two years old, and much depends on a similarity of temperament. When yoked, a strip of board should be fastened to the horns by strings, which will prevent them turning their yoke. Too much caution cannot be used in the breaking, as many of the bad habits of working-cattle are acquired during that time. When first yoked, they should be permitted to stand, during the day, in the yard. In this way they become accustomed to the yoke, without any trouble on the part of the owner; and will generally, before night, walk about the yard together in the yoke, taking feed from the hands of the master. On the second day, put them into the teams, between two yokes of oxen if convenient, which day's work will generally satisfy them that what cannot be avoided had better be patiently endured. If a steer refuses to go, and lies down in the yoke, inserting a pin in the end of the tail will change his mind immediately, and bring him to his feet; when coaxing, whipping, or dogging will make no impression. Two or three trials of that kind, and he will forever abandon the experiment. Gentleness and using will, then, soon make them

obedient and handy. My estimates of cattle will be understood to apply only to imported breeds, under good management. Neglected stock fall short of the estimate from one-third to one-half.

Sheep.—The raising of fine-woolled sheep is generally abandoned in this vicinity, and coarse sheep, for mutton, have been substituted, which are considered the most profitable stock of the farmer. The South Downs are preferred, for the purpose of raising lambs for market. The number of lambs will generally exceed the number of ewes in a flock. The lambs should be dropped in February or March; they are sold, at four months old, from $2 to $2 50 per head, some flocks selling as high as $3; while the fleece from the ewes will bring about the same as a fleece of fine wool, the quantity per head being greater. For raising lambs, a flock should not exceed fifty in number; while thirty is, perhaps, a better number. During the season of lambing, the sheep must have good shelter, and a good supply of roots or meal. This food, till grass, will insure a good market lamb.

Yours, with much respect,

ALBERT N. BALDWIN.

Hon. Thos. Ewbank,
Commissioner of Patents.

Milford, New Haven County, Ct.,
December, 1851.

Sir: I herewith send answers to some questions contained in your Circular for August, 1851, which asks information on the various branches of agriculture. A part of the topics *only* are noticed; for you truly say that no one person can be expected to reply to all the questions, as they extend over the agricultural productions of the whole country.

As much of the land in this county has been cultivated for about two centuries, and as most of the farms are not large, as compared with those in some other States; as the primitive soil was not remarkably rich; as fertilizers are not very abundant; and as labor commands a high price, you will readily see the circumstances in which products of agriculture are produced. All localities should be judged by their peculiarities.

Wheat.—There is but a very small proportion of wheat raised in this county, or State, as compared with the quantity of wheat-flour which is consumed by the inhabitants, and for manufacturing purposes. Formerly, a fair crop of wheat could be raised in this region; but, latterly, the wheat has either shrunk or blasted so much, that its cultivation has been neglected. But, for the last two years, the wheat has done better; and at the late agricultural fair in this county, and more especially at the late fair in Fairfield county, some fine samples of very plump wheat were exhibited, and the growers stated that the crops were much better than formerly. Perhaps the liberal use of lime and ashes, as manures, has something to do with these improved crops of wheat. Both fall and spring wheat are doing better than formerly.

Corn (Maize).—This is the most valuable crop which is raised in this

State; not that it will compare with the crops raised in some western and southwestern States: yet it is large enough to supply the inhabitants, and have a considerable surplus for exportation. This surplus is sent to the States lying easterly of this State, and to the West Indies, in the shape of corn meal. But as the West India trade has declined, the exportation of corn meal has proportionally declined. Guano is not extensively used in raising corn, as its cost is relatively higher than other manures; but where it has been used, it has answered a good purpose; and, in small quantities, it is applied either in the hill, at the time of planting, or about the corn at the time of first hoeing. The yellow variety is mostly preferred, and generally the ears with eight rows are grown; but some prefer the ears with ten and twelve rows. The ears with eight rows ripen earlier than the other varieties. From 20 to 60 bushels the acre are raised; but this quantity is varied both ways, according to the state of the soil, the mode of tillage, and the season. Various modes of tillage are pursued. Some sward-lard is ridged, and the corn planted on the ridge, and the balk is ploughed up at the first hoeing; afterwards, the corn is hoed once or twice, according to circumstances. Others plough the whole land flat, and plant upon the furrows. Flat tillage is coming into general use; the labor is thus lessened, and the land is in a good condition to bear the drought. Four kernels are dropped in a hill, and the hills are about three feet and a half apart. It is better to spread the manure, and plough it in, than to place it in the hills, especially if the season be dry. Thorough tillage generally pays well. From ten to twenty cords of yard-manure to the acre are needed to insure a good crop. Corn should be planted as soon as the season will permit.

Hogs fatted on corn make the hardest and best pork; sometimes it is fed whole and sometimes the corn is ground. When fed in both ways, hogs thrive better than when it is fed either way alone. Generally, corn is fed raw, but hogs like it better when occasionally cooked; yet this mode is not generally followed, for want of cooking conveniences and the high price of fuel. If the cultivator is able to do the work himself, with the rent of the land, the value of manure, the team work, and the seed, a bushel of corn may be raised for from 25 to 30 cents; but when all the labor is hired, but few farmers make their fortunes by raising corn in Connecticut. For some years past, the price of corn has ranged from 75 to 90 cents the bushel.

Oats.—Most of our farmers cultivate this crop and in rotation. Oats usually follow a crop of corn or potatoes, and with this crop the grass-seed is sown. From 20 to 25 bushels the acre are considered a good yield; and from 2 to 3 bushels of seed are sown to the acre, according to the goodness of the land; on rich land, the lesser quantity will answer. Oats should be sown as early as the season will allow, as early sowing goes far towards producing plump oats. Most of the oats are fed to horses; but corn and oats ground together make fine feed for hogs. Oats exhaust land more than rye.

Rye is extensively cultivated, and yields from 20 to 35 bushels the acre, more or less, according to the richness of the land and the thoroughness of the tillage. The crop of rye is greatly increased when the land is manured with whitefish, which are bought at the landing places at from 50 cents to $1 per thousand, according to the supply and demand.

Although the whitefish greatly increase the crop of rye, yet some farmers think that their effect is to bake the land too much, and others believe that they tend to fill the land with sorrel; but, notwithstanding these objections, they are extensively used as a manure in most of the sea-shore towns. Rye exhausts the lands less than almost any other grain; and if cradlers leave the stubble high, some land will bear good crops for many successive years, and the last crop will be as good as the first. A bushel and a peck are usually sowed to the acre. The price ranges from 75 to 85 cents the bushel.

Barley is raised to some extent, but not very generally. The yield of barley to the acre is about the same as oats; but barley requires richer land than oats. Most barley is used by the brewers; but, as temperance has increased, the price has lessened, and the quantity raised has diminished. Barley yields from 20 to 30 bushels to the acre, and the usual price is from 80 to 90 cents the bushel. A bushel and a peck usually sowed to the acre.

Peas and Beans are not raised as a field crop, but they are generally raised in gardens for culinary purposes; but some gardeners raise considerable quantities, which are sold in New York and other large markets, and are thence distributed over the country among other garden seeds.

Clover and Grasses are cultivated, more or less, by all our farmers. From one to two tons are raised to the acre, according to the richness of the lands and the season. Yard manure, and sometimes ashes, are the usual fertilizers. Some farmers are in the habit of feeding out to their cattle, from stacks, the hay which has grown upon the land. Near the sea-shore, plaster of Paris is not worth much as a fertilizer; but in the inland towns the gypsum answers an excellent purpose, and is extensively used. In laying down land to grass, about half a bushel of herdsgrass and four quarts of clover-seed are sown on an acre. Sometimes a few quarts of red-top are used. A mixture of herdsgrass, red-top, and a little clover, make excellent fodder. Clover alone is not saleable; it is apt to be dusty, and then it brings on the horses a cough. After the second crop, the herdsgrass and red-top soon wear out the clover. The growing, curing, and securing a ton of hay usually cost about $6 or $7. In ordinary seasons the first quality of hay brings from $9 to $11 a ton.

Daily Husbandry.—There are not a great many large dairies kept in this region; yet all the farmers keep some cows, and many of them very fine ones. There is a great difference in the quality of cows; some will make from 75 to 150 pounds of butter in a year, and some a much less quantity. Good milch cows will make about as many pounds of cheese as of butter in a year. Dairymen do not generally churn their new milk; but the milk stands a few days for the cream to rise on the top; then it is churned—sometimes in one, sometimes in another, of the great variety of churns now in use. Butter ranges in price from 16 to 25 cents, and cheese from 8 to 11 cents, the pound, according to circumstances. The numerous manufactories and workshops in this State afford good markets for butter, cheese, and other dairy products.

Neat Cattle.—This region is famous for "red working oxen," and all other kinds of neat cattle. For form, for action, and for general beauty, the "red cattle" of this county, and indeed of other parts of this State,

are much celebrated. At some of our cattle-shows may often be seen 200 pairs of "red working oxen," which could hadly be beaten in performance and beauty. The cows and young cattle also show that the breed is not degenerating. These oxen "speed the plough" handsomely at our ploughing matches, and the cows furnish a good supply of rich milk. Some pairs of these oxen sell for from $100 to $160, and some will bring higher prices, especially those which have easily managed ox-carts loaded with 4,500 pounds of stone. Good milch cows, in the spring, are worth from $35 to $75, and in the fall, from $25 to $35. It costs from $14 to $23 to rear three year-olds. Good three-year-old heifers are worth from $15 to $35; but the prices vary according to their milking qualities and general appearance. Good steers are worth from $20 to $40 each, and when well marked, and work well, they command higher prices. Most farm work is done by oxen; but horses are used for distant transportation. The question, "How are steers broken to the yoke?" admits of various answers. Steers are more easily broken to the yoke while yearlings, and sometimes at an earlier age; but they are generally broken when two years old. The "boys" catch the steers and yoke them; after remaining yoked for some hours, they are trained around the yard, or lot, and, after repeating this training for a very few days, they are put to light work. Some "boys" (for breaking steers is generally boys' work) yoke up the steers, and forthwith put them on the chain, between two pairs of oxen, and make them "go ahead" any how. After the steers have been worked a few weeks, and the team is about to come home, the young steers are put forward, and made to lead the team homeward, which they do willingly. Soon they learn to "hoi and gee" easily. The second year, the steers work upon the neap of empty carts, and soon learn to hold up their heads, as drivers bid them; and when they are four years old, they manage the carts as handily as the old oxen.

A few full-blooded Devons are kept, but more generally crosses with Devons, and sometimes with Durhams. Most of our farmers believe that native cattle are kept more easily than imported.

Horses and Mules.—But few mules are reared in this section of our State, and those which are shipped to the West Indies mostly come from the western and middle States. Some good horses are reared in this region, and they are receiving an increasing attention. Very few persons are largely engaged in rearing colts, and most of those reared come from brood mares which are used in ordinary farming business. When the mares are ridden or driven to the "meeting-house," to the mill, or to the farm, the colts go also. Mares are as carefully treated as their condition requires. In this way, the rearing of colts is profitable. Three-years old colts will have cost from $25 to $40, and they are often worth from $50 to $80. The breaking of colts is also the "boys'" work, and they begin to halter and handle them quite young. Colts are put to light service as soon as they are able to work; but if they are ridden before they are three years old, they are liable to become "hollow-backed," and are otherwise injured. From infancy, they are kept by the side of their dams; and when they are about three years old, they are harnessed, and by the side of their dams they trot off, as usual, and soon become good workers.

Sheep and Wool.—Some sheep are kept by most farmers in this vicinity; but most of them keep small flocks—enough, however, to furnish

wool for family use, and some to spare. When there was much unenclosed land, in many towns there were large "town flocks," belonging to many owners, and were tended by a shepherd; but since these lands have become enclosed, the "town flocks" have disappeared. Although wool-growing is not extensively carried on, yet our farmers believe that this business would be profitable, if sheep could be protected from the ravages of dogs. But dogs are so plenty, and so mischievous, and it is so difficult to obtain indemnity for their ravages, that for *this* and some other causes the number of sheep has lately diminished. In the northern part of this State, sheep are more plenty, and more wool is clipped. It is thought that wool can be grown at from 15 to 20 cents the pound, and for some time past prices have ranged at from 40 to 50 cents the pound for the wool of sheep crossed with merinos. The wool of full-blooded merino and Saxony sheep commands a higher price. Some of the first imported merinos were brought to this country by the late Col. David Humphreys. In the course of a few years, the "merino speculation" ran so high that some rams sold for $1,000, and ewes commanded enormous prices. But, like other speculations, this has passed away, (leaving some "wrecks" behind,) and now merinos can be had at moderate prices. Their fine wool is more valued in the manufactories than for family use. The merino wool is no stronger than that of common sheep, and it is harder to work up. Most of our farmers think that the native sheep are kept more easily and cheaply than the merinos or Saxons. These last would nearly starve on short pastures, where the *natives* would thrive. The mutton of the imported sheep is no better than that of the natives, and the latter costs much less than the former. A cross of one-quarter imported blood with three-quarters native blood suits many farmers.

Hogs are not raised in large droves in this vicinity, but almost every family raise their own pork, which is esteemed better for *their* use than any that can be bought. Our pork is of the first quality, and as good as the very best. By a State law, swine are not "free commoners;" but towns can make laws to allow them to go at large. Many always keep their swine in pens; but others allow them to graze and feed upon their own lands till they are ready to be fatted, and then they are penned and corn-fed till they are ready to butcher. When about a year old, the hogs will weigh from 300 to 500 pounds; and spring pigs, killed in December often weigh 300 pounds. A mixture of "old-fashion hogs" with Berkshires, and with the China breed, generally does very well. But more depends upon the *feed* than upon the *breed;* but in this last there is a choice yet almost any breed makes good pork when fully fed. Whole corn is generally fed out; but when the hogs have become fat and lazy, they prefer ground feed. Hogs are better fatted with old corn than with new, especially if fed with ears, as the ears of new corn make their teeth sore. Raw corn is generally fed out; but just before killing time, the hogs like cooked food, and those who have cooking conveniences, and plenty of fuel, pursue this method. Pork is worth from $5 to $7 the hundred pounds.

Root Crops.—Turnips are much raised as a field crop, and they are raised in increased quantities. Rutabagas and the Scotch variety are raised cheaper than a crop of hay, and they help out the fodder. They

are usually sowed broadcast, but they pay well when sowed in drills by those who can conveniently so cultivate them. Sward land, in good heart, rather moist soil, and well tilled, in a favorable season, will yield from 200 to 400 bushels the acre. Raw turnips help hogs, which eat them readily; but when cooked, hogs are fond of them, and thrive very fast. Turnips are good for milch cows; but as for their fattening qualities, there is much difference of opinion among farmers.

Potatoes are generally and extensively cultivated. Mercers, pink-eyes, black, red, and other varieties are raised. The former will bring from 12 to 16 cents more a bushel than the latter, and the latter generally yield better than the former; and some think that the mercers are more liable to rot than the other varieties. Rows about two feet and a half apart, and hills about one foot and a half apart, answer very well. By this arrangement, the vines usually so cover the ground that the potatoes will neither suffer from an ordinary drought, nor be scorched by the rays of the sun. At the first hoeing, they can be tilled with the cultivator, and afterwards with the plough, and the hills can be properly rounded up. Potatoes require a tolerably rich soil, and yet for a few past years it is known that on rich land, which has been highly manured, the potatoes have rotted more than on land less manured. The cause of this is not known, but the fact is fully established. In this vicinity the potatoes have not rotted as much during the last year as in preceding years. For six or seven weeks in July and August there was very little rain, and during the drought there were no signs of the rot. But soon after the rains commenced, the signs of the rot appeared. If the rot is caused by insects, which work down the vines to the potatoes, why are not the potatoes nearest the root of the vines most diseased? and why are the potatoes nearest the vines, and near the surface of the ground, often sound, while in the remote parts of the hills, and at the extremities of the roots, are found rotten potatoes? Some think that the weather has much to do with the rot; and others believe that, from age or some other cause, the potato itself has begun to degenerate. For some years past those potatoes have done best which were planted very early in the season on a dryish soil, not very highly manured. A good yield is now considered to be from 150 to 250 bushels the acre. The same land which now produces the above-named quantities formerly produced from 200 to 400 bushels the acre, with like tillage and manuring. Why this falling off? Who can tell? Pains should be taken to get good seed, and seed from a distance does better than to plant the same potatoes which grew upon the land.

Fruit Culture.—Less apples are now raised in this part of the State than formerly. The increase of temperance has decreased the orchards; for cider is viewed as an intoxicating drink by many, and it is not as generally used as formerly. But many young orchards are being set out, and many trees being grafted, not so much for cider-making as for obtaining good apples to eat. Many consider apples as good as potatoes for hogs and other animals. Great care is now taken to obtain choice fruit. Seek-no-furthers, Rhode Island greenings, Baldwins, and russets are the varieties now highly valued.

The agriculture of this State has powerful competitors in the agricultural interests of western States. Their new, fertile, and cheaply-acquired farms, their comparatively mild winters, together with the great

facilities of intercommunication, naturally and forcibly tempt our young and middle-aged men to migrate westward; and this tends to increase the price of labor so much, that our agriculture cannot be carried on profitably by hired help. The crops in the West are also more abundant, and raised at a much cheaper rate; and the facilities of transportation are such that the prices of western products regulate the prices of the agricultural products of this State. These things are not mentioned as matters for complaint, but rather to exhibit our real condition. But with all these disadvantages to contend against, our enterprising and persevering farmers make our agricultural interests far exceed in value those of any other branch of our industry.

I am, sir, very respectfully, your friend, &c.,

CHAS. H. POND.

Hon. THOS. EWBANK,
Washington, D. C.

GROTON COUNTY, NEAR NEW LONDON, CT.,
December 20, 1851.

SIR: Your Agricultural Circular of the present year came to me through the postmaster of New London; and, though this reply to it would be considered common-place here, it may be interesting in other localities to know how we farmers are situated, and get along, in the old settled portions of our country—in *Connecticut especially;* from which I have not noticed any letter in either of your two volumes of Agricultural Reports—the only ones I have seen.

My farm lies on the east bank of the river Thames, about one mile north of the growing city of New London, lying on the west bank. It contains about 280 acres of land, of which about 130 acres can be ploughed. The rest is woodland; the plough land is not smooth, but has granite boulders scattered over it, and it is hilly withal.

The soil is generally loam, inclined to clay, and lying about three feet deep on the subsoil, composed of sand, clay, and small stones, so hard that it requires a pick-axe to break it up. The farm cost me, in 1837, $8,000, and has been cultivated 200 years. At the time I purchased, the buildings, with the wood and timber on it, were worth $3,000, which would make the value of the land about $5,000.

This is a very prosperous part of the country, which is evidenced by the price of labor, which, for a man to work on a farm, it is not less than $150 per year, with board, and it must be such board, too, as is right, or it will not be satisfactory.

Women to do house-work are in great demand at $1 or $1 50 per week; at these prices, one can hardly afford to hire an American woman.

The farmer, therefore, gets along with as little help as possible; and those of us whose work is done by their own families, and have a small capital—say $2,000—to commence with, are very thriving; and, in the course of 10 or 15 years, accumulate from $10,000 to $15,000.

Taxes are small in this locality; all taxes, with school taxes included, are not 25 cents on $100; and we have good schools, too, for 10 months n a year; and everything the farmer has to dispose of he can get as

high a price for as is obtained in any part of the United States, and get the *cash;* and what he buys he can buy as cheap. Here likewise the small capital of $2,000 may be obtained by any young man by the time he is thirty. Those who have it not at that age among us (with rare exceptions) have either been intemperate, improvident, indolent, or in too great haste to marry.

Our ordinary course of farming is, the first year, to break up grass land, and plant corn. Our average crop of corn, taking 10 years together, when we apply equal to 10 cords of stable dung, of 30 bushels each, to the acre, is 40 bushels. The cost of the manure, if purchased, is $10.

Corn has averaged in price in this vicinity, taking the last 10 years together, 80 cents. It has been as low as 67 cents, and as high as $1 25, during that period.

I have given the average crops. The last season, on the application of 10,000 bony fish to the acre, at a cost of $7 50, with the addition of 3 loads of stable dung, at a cost of $3—in all $10 50—I got 55 bushels of corn to the acre. I think my corn costs me 60 cents a bushel to raise it, over and above the use of the land. Corn is a natural crop here. It rarely fails but for want of manure and attention.

The second year, our ordinary course is to plant *potatoes*. When they did not rot, the average crop was 150 bushels to the acre, if manured with ten loads of good manure to the acre. Since they have rotted, they average about 60 bushels to the acre. The great preventive against the rot with us is, to plant very early, and of the earliest kinds. The price for the last four or five years has averaged 70 cents per bushel; they are now worth here 80 cents per bushel. The third year, we seed down to *grass* with rye or oats. Our average crop of rye is about 15 bushels to the acre; our average crop of oats, about 25 bushels to the acre. In seeding down our land, we put on eight pounds of clover seed, a bushel of red-top, and eight quarts of herdsgrass, (timothy.) I prefer red-top to any other grass for hay. I do not think clover of much value for hay; and if I could get a crop of other grass the first year after the grain crop, I should not sow any clover.

We mow our land for seven years after seeding down, and then plough again. My hay crop last year was 40 tons, cut on about 36 acres of land. This, with an ordinary quantity of corn-fodder and straw here, is sufficient to winter well 30 head of cattle. The crop of hay last year was about 10 per cent. more than an average. The cost of cutting and of curing a ton of hay, the past season, was about $2 50.

Neat Cattle with us are very healthy. I have never lost one by sickness since I have carried on a farm, now fourteen years, with an average stock of 20 head; nor have I ever had one afflicted by any disease, except the horn-distemper, which is easily cured, if taken in time, by boring the horn nearly through with a gimlet on the under side, about three inches from the root.

The value of a cow here now is about $20. In the spring, the value of the same cow, with her calf, will probably be about $28.

I prefer cattle mostly of native blood; say three-fourths. I think on the amount of food they get with us, such make both most flesh and milk. The average weight of our native cows, well fatted, is 550 pounds with hide and tallow; they are considered well fatted if they run in a good pasture, without being milked, through August, and are fed plenti-

fully with green corn-stalks through September. Such a cow will ordinarily have at least 40 pounds of rough tallow. The average weight of our oxen, which are in a good pasture for 4 months—that is, from July till November—and have, through October, plenty of green corn stalks, is 900 pounds. We rarely give grain to cattle we intend to dispose of before the 1st of December; after that time, beef rises, and keeps up till the 1st of July, when it falls again. Eighty per cent. of our stock fatted for market I think is fatted in the foregoing manner. The common age at which our cows and oxen are sold to the butchers is 10 years.

I do not think that imported breeds of *hogs* are more profitable to keep than native breeds. The common age of our hogs, when we kill them, is about 18 months; at that age they will average about 350 pounds each. I have mine shut up in the pen about 5 months. In that period, each will consume about 10 bushels of dry corn.

Meal will make pork faster than corn; but not sufficiently so to pay the expense and trouble of procuring it in ordinary cases.

I think if hogs are healthy, have a dry house to sleep in, and are protected from the wind, but not too warm, 600 pounds of corn will make 200 pounds of pork, if fed out in the fall months.

Besides currants, and other small *fruits* of the garden, the two kinds of fruit most certain here are peaches and quinces. With me, as yet, neither have failed; and I think I can raise either, at the present high price of labor, at 40 cents a bushel. Pears are quite uncertain here; and as for apples, one year we have the rose bug, the next year the canker worm, and the third, perhaps, (and worse than either of the others,) a small insect very much resembling the southern sand-fly, which eats up the leaves as fast as they are developed. This insect has been so destructive to my trees of late years as to have quite killed several.

Bating insects, both soil and climate here are good for the apple tree They are often found in our woods as volunteers, and many attain a large size.

I have apple trees containing a cord of wood each. Lime and plaster are considered no fertilizers with us. Ashes are considered very valuable. Ten bushels of dry ashes per acre I consider equal to 30 bushels of the best stable-dung. I have tried African guano on corn, at the rate of 300 pounds to the acre, at the cost of $2\frac{1}{4}$ cents per pound. I did not think it paid at that price. This was in 1845. Market-gardening is carried on as extensively here, perhaps, as farming proper; but I have confined myself, as you will see, to the latter entirely.

Yours, &c.,

BELTON A. COPP.

To the COMMISSIONER OF PATENTS.

NEW YORK.

POTSDAM, ST. LAWRENCE CO., NEW YORK.

SIR:—Your "Agricultural Circular" has been put into my hands by my friend, the postmaster here, with a request that I answer it, so far as I can; with which I cheerfully comply.

Wheat.—Guano is not used in this county in the production of wheat, or of any other crop, unless it may be for the purpose of experimenting on a small scale. It would not pay cost. The principles or specific food of plants contained in guano manure are yet *abundant* in our almost virgin soil, and neither this fertilizer nor plaster will ever be much required in most parts of this county, if farmers do but husband what resources they have. The average product of wheat per acre is probably not far from fifteen bushels. The surest crop is the spring variety, and this is much the most raised. The most profitable method of raising either spring or winter wheat, is to sow it after *clean* hoed crops of either corn or potatoes. The next best method is to follow after peas. My own method is to plough but *once* for wheat or any other small grain, after corn, potatoes, or peas—the depth six or more inches; but am governed somewhat by the depth and nature of the soil and subsoil. The time of sowing fall wheat is from the 1st of September till November; but the earliest is surest and best. Spring wheat is sown from the 1st of April until June, and here again the earliest sown is surest and best. The last sown, in both cases, may have the largest growth in straw and chaff, but the earliest will exceed the other in quantity and quality of wheat. The harvesting of winter wheat is in July, and of spring in August, with some little variations. The seed is best prepared by first selecting from any given variety the most perfect of its kind, either by screening through our grain-cleaners or mills all the small or imperfect kernels, or by *casting out*—throwing from one end of the barn floor (30 or 40 feet) to the other—and thus, at the extreme end, obtaining, of course, only the largest and heaviest grain. I am convinced that, in order to keep up the healthy character and productiveness of any variety of wheat, and in fact any other vegetable with which I am acquainted, we must use for the seed *the most perfect of its kind.* The quantity sown varies from one and one-fourth to two and one-half bushels per acre. The quantity raised is evidently less than formerly, when compared with the increase of population, mostly for the reason that the West can afford to undersell us. We cannot compete with the West. Their cheapness of lands and facilities of raising it prevent it.

The best remedies against the weevil or Hessian fly, or any other insect or disease of any kind, is—first, use only the pure and perfect seed in clean and suitable soil, in good season; and, to insure against smut, wash it in water; then let it stand from six to twelve hours in a brine of common salt, dissolved to the point of saturation; after which, mix from two to four quarts of fresh slacked lime with each bushel of wheat; and thus let it remain for a few hours. The price is, this year, 87 cents in this market. The average price heretofore has been one dollar.

Corn.—The average product of corn may be made forty bushels per acre, but twice and thrice that figure are sometimes raised. The cost of production, as usually made, is probably fifty cents. The best system of culture is to plant on green sward, and the best soils are found on our clayey, loamy, or gravelly, black, sandy ridges of land. We do best to break up the soil to a depth of six or more inches in September, in narrow furrows, breaking and turning over every foot of the land. Upon this, by the 10th or 15th of May following, we put our barn-yard manure—from ten to twenty cords per acre, as we have it, or as the field requires it—in heaps so near that, when spreading it, every part of the

field can be readily reached by the spreading operation. When this is well spread, it is finally harrowed in with a light harrow; thus intimately mixing the manure with the soil on the surface. The surface is thus mellow and rich, and should be at once planted. The soil below is not and should not be disturbed, either in this operation or thereafter, throughout the after-cultivation; and the best instrument to be used is the horse-hoe, or the horse-harrow; the surface should be kept clean and mellow by the frequent use of the said cultivator and the hand-hoe. A good crop is easily obtained by such process, and the ground is in good order, with one more ploughing, for a crop of wheat. With the wheat we again lay down to grass.

The best method of feeding corn to hogs, is to first grind and then cook it. If to be fed alone, in the form of pudding, I have found it profitable to mix it with pumpkins, apples, and refuse potatoes during the first weeks of feeding.

Oats.—The yield of oats is also about forty bushels per acre; from two to three bushels are used for the seed. Of peas, we generally get about twenty five bushels per acre, and sow two bushels or more per acre. I consider oats to be exhausting to land—considerably more so than peas. I believe the manure made from peas and their vines, or fodder, to be of the most valuable kind. As a food for man or animal, and as a crop preparatory to either corn or wheat, I am confident it is not appreciated as it should be by St. Lawrence county farmers.

Grasses.—The grass-seeds mostly used are the timothy (herdsgrass) and red clover. White clover is indigenous to most of our section of country. The usual quantity per acre for hay is, of timothy one peck, and of red clover one or two quarts, as the farmer chooses to mix. The quantity of hay per acre will average about one and-a-half ton. "The best fertilizers for meadows and pastures" are the most *simple* form of rotating crops, as I have before described, especially where lands will admit of it. Moist meadows, not bearing to be ploughed, should not be grazed except by sheep; and such meadows, and those pastures on which *only* sheep run, will admit of having plaster, one bushel per acre annually. *Permanent* meadows may be kept so, and their fertility kept up *if not grazed at all,* provided one bushel of plaster annually be sown in August or September. The price of good meadow lands will average perhaps twenty dollars per acre, and farms are worth from ten to forty dollars per acre, depending of course much upon position and circumstances of soil and buildings.

Dairy Husbandry.—This county is fast becoming a great dairy county, scarcely behind any in the State, and we have but just begun in the business. It is well adapted to the rich grasses, and it is, most of it, well watered. The climate for a dairy business is also equal to the best. I believe that now there is only one county (Herkimer) ahead of us in the dairy products, although it is but a few years since our farmers have turned their attention to it. I have travelled over, and have eaten of butter of several of the northern, middle, and western States, and have not anywhere found so rich and yellow butter and cheese as we make here—in the months of June and July particularly. During that season many of our pastures and other fields abound with a large proportion of the dandelion plant, the nutritive properties of which, together with the coloring principle in the plant, when eaten by the cow, impart to the

milk that *rich* flavor and color which I have nowhere else seen. Instances are frequent where the avails from a dairy of cows will average thirty dollars each. Dairies of good cows will make 225 pounds of butter per cow. This is, to be sure, rarely done; but there is no difficulty in doing even beyond this where the farmer has good cows and proper facilities for making. Cows are worth, in the spring, twenty-five dollars; in December, fifteen dollars. Three-year-old cattle are worth from twenty to twenty five dollars each. Butter is worth, until September, fifteen cents; thence, until December, fourteen to fifteen cents. Cheese is worth, in the fall season, five to six cents per pound. It is mostly sent to the Boston and New York markets.

Horses.—The growing of horses is profitable here; good horses always sell readily from $75 to $125 each; ordinary horses are worth from $50 to $75. The price per acre for the pasturage is about $1; and hay is worth, on the average, $5 per ton. It can, therefore, be easily determined by any one, whether the growing of horses *is* or *is not* profitable.

Sheep and Wool.—As to wool-growing, after having had some experience in the business, I have no hesitation in saying, if there be *any* profit in it, it is *much* less than that of raising horses or cattle, or in dairying. The large breed of sheep are most profitable for their carcass, and more than for their wool; yet their wool sells nearly as high as do the finer grades. Their flesh is better, and they tell on tallow better. They are more hardy, and their increase more to be relied on. One hundred hardy, coarse woolled ewes will raise 100 lambs where the Saxon will raise 25 and the Spanish merino 50; each having equal care. The Saxon will shear 2½ pounds, the old-fashioned merino 3½, and the coarser varieties we have here will shear 5 pounds of wool. Buyers here make but few cents difference. For 10 years past, the price per pound will average *closely* upon 28 cents—only the average price of 2 pounds of butter; and the average value of a fleece of wool is not greater than for 8 pounds of butter.

Hogs.—Pork-raising is profitable under certain circumstances *only*. United with dairying, it is a good business; but the *calculating* farmer sees to it that no greater number of hogs are kept than can be *well* kept on the refuse *after* the butter or cheese. Pork is worth from 4 to 6 cents per pound, according to weight of hog, and also to quality.

Root Crops.—The cultivation of carrots is on the increase, and their raising and feeding are found profitable. The raising of turnips has declined; with us it never can supplant the potato. The average yield of potatoes per acre varies much in different years, without regard to the soundness or unsoundness of the crop. The average in the county last year, so far as my information extends, was 200 bushels per acre; this year it does not much exceed 100, even where there was no disease. Up to the year 1849, our farmers could raise potatoes for 15 cents per bushel, and do quite well; since then, our near facilities for market permit us to sell for from 25 to 35 cents per bushel. There has been some disease, or rot, with the potatoes in this county for several years past, but it has been *far* less than at the east, or in older portions of this State. I believe that one reason why we have had less of the rot than most other portions is this: their value has been so low, and the quantity raised so great, that there has been no inducement here, as a general practice, *to scrimp in the seed.* The farmer living where their value

is 4 shillings, would plant a smaller *piece*, or a smaller potato, than would another living where they were worth only 1 shilling per bushel. Our farmers, whose invariable practice it has been for twenty or more years past to plant one good-sized whole potato in each hill, have had no "rot" of their potatoes, and but little diminution of quantity, as compared with former years. The stems, seed-balls, and leaves give the same indication as they did from 20 to 30 years since. Such farmers as follow the old common-sense method of seeding, now get 300 bushels per acre ordinarily.

I desire to take up more time in this matter of the potato disease, as it is called, because of its importance, and because I feel quite sure of the remedy, as well as the cause, or rather causes. I wish for space to say that I believe *the* cause is in the improper manner in which the plant has been cultivated for many years past—planting year after year with but *parts*, or with the smallest of the unripe tuber, and planting so late in the season that it seldom came near maturity. We treat no other vegetable in the like manner; should we do so, we should soon learn the fatal consequences. A few years since, and for 2 or 3 years in succession, I lost seriously with the rot, and I then followed the eastern and *common* practice of using small seed, as well as late grown and late planting. I was induced, by observation and reflection, to change my practice—to plant early, on dry, rich, and warm soil; to use for seed good-sized and the *ripest* potatoes, planting them whole. I covered the seed to the depth of 4 or 5 inches; and, after the plant came up, kept the ground clear from weeds, and the surface often mellowed with the harrow or cultivator. I plant several varieties, and for 5 or 6 years last past have lost scarcely any. These have been fairly tested in several instances, and have not failed; where others, differently treated, have been ruined. It may and will be asked, if this comes to light, if the cause and the remedy are so simple, why has starving Europe, or our enlightened and suffering North, not found them long before this? I cannot tell why; but will reaffirm my opinion, as before, and have abundant proofs of the facts of my practice and its results; and will venture to predict *that the disease of the potato will continue to appear*, more or less, (something, to be sure, according as the seasons may differ,) *so long as the practice is adhered to of growing the potato as in former years.*

Fruit.—The cultivation of apples is receiving much attention in this county of late. Our farmers are taking great interest in that matter. I have no doubt that the business will be made very profitable, either for market, for family consumption, or to feed (when cooked with potatoes, pumpkins, and meal) to swine. I have had some practice in feeding apples to swine, as above, and am sure of their value.

Manures.—Plaster is used here to some extent; it is used on grass mostly, on mowing fields, and also on grain. It is found profitable, at $8 per ton even, to apply to wheat or rye when the land is sandy; and the grain has been sown upon the sod, or turf. It is used to good advantage on grass; particularly on permanent sheep pastures, or on meadows where they are soon to be broken and manured with yard manure. Lime is not yet much used in farming. My own practice is, to use plaster, lime, salt, and ashes, slacked and unslacked, mixed in my cattle-yard with the manure of the yard and stables. I mix those ingredients in the yard, and in the heaps of the yard, while they are

forming; aiming to prevent, as far as possible, any escape of the extract or ley from the yard, or otherwise, by evaporation from the heaps of valuable principles; or, in other words, valuable vegetable food. By a sort of reservoir or basin in the yard, I prevent its waste by running off; and by the use of plaster in and upon the piles, I prevent much of the evaporation. I throw the long or strawy manure into such heaps, in season to have fermentation take place, and *slow combustion* considerably advanced, before I wish to draw it to the field, to apply to my corn crop. The fermentation through which it has passed destroys most of the seeds of weeds with which unfermented manure is usually invested. A better and more correct knowledge of the science of farming is greatly wanting; and that want is not confined to this county. The conviction is evident to my own mind that only about one-half of the amount of farm products is obtained that would be from the same quantity of land by the same amount of labor *provided the laborer but understood his art, so as to give to his labor the right direction.* It has been my fortune (*or misfortune*) to work some one dozen or more farms which had been *carried on* "aforetime" by as many different proprietors. I base my opinion, therefore, on practical experience, as well as upon observation.

I am, &c., sir, yours, respectfully,

ISAAC PARKER.

T. EWBANK, *Commissioner.*

LAFARGEVILLE, *January* 8, 1852.

SIR: I duly received the Circular of your Department sent me August, 1851. For the package of seeds you were so kind to direct to me early in the spring, you will accept my hearty acknowledgments.

Our season here has been again uncommonly wet, the past year very perplexing during hay time; but all crops have returned well and heavy, excepting potatoes and corn.

Corn, in many instances, did not come up after planting. Some farmers attributed it to the seed having lost its germinating power by being ever and anon washed in the field by the long-continued fall-rains. But I think it was rather owing to the damp, cold, heavy state of the soil at the earliest times of planting. The heavy bodies of snow that fell during winter kept the soil from the beneficial action of the frost, packed it hard down, and the result was, that the ground generally ploughed up cold and heavy. Many fields had to be planted over once, and some twice, the corn not coming up until the soil grew warm with he advance of the season. The unusual warm temperature of September, and the autumnal frosts holding off until the 17th of October, saved the crop from a total failure.

The *potato crop*, as usual in wet seasons, became subject to disease; and though the rot was not so extensive in its ravages as in former years, the vines being cut down by rust, the crop was arrested in its growth, and the yield few and small.

The agriculturist, as well as the mariner, being daily exposed to the vicissitudes of the atmosphere, and the means of judging of the weather being of so much beneficial service to both, the study of *meteorology*

becomes a part of their trade. If I may, therefore, be permitted, I will subjoin an abstract of some observations on the weather, made during the year 1851, in the hope that they may perhaps contribute my humble mite to the information required under the head of meteorology. The instruments used were a thermometer in the shade, under a piazza open to the north and west, and a barometer in-doors; the place of observation about lat. 44° 10′, lon. 1° east of Washington, and, I believe, nearly 371 feet above tide-water in the Hudson.

The yearly Patent Office Reports are so replete with useful information collected by the department—these valuable documents recording the interchange of notes between agriculturists and other scientific men of all and the remotest parts of the Union, on all that is or may become practically interesting to the mechanical and farming interest of the country—are so highly prized throughout the land—that it is much to be regretted that Congress should limit the publication of copies for distribution, and that a copy should not find its way upon the shelves of every school-district library in the Union. Since 1848 we have not seen a copy of the agricultural part of the Reports in this northern region.

I am, sir, with great respect, your obedient servant,

JOHN N. ROTTIERS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

Abstract of Meteorological Observations for 1851.

Months.	Mean temperature, Fahrenheit.			Mean height of barometer.		Remarks.
	Morning.	Noon.	Evening.	Morning.	Evening.	
January	×22	×30	×26	29	29	Mostly cloudy.
February ...	×24	×42	×32	28.90	28.90	Nineteen days cloudy, snow, or rain.
March.....	×28	×42	×28	29	28.90	Twenty-one days cloudy, snow, or rain.
April.....	×35	×47	×46	29.10	29.10	Twenty-two days cloudy and rainy.
May.....	×51	×65	×58	29.10	29.10	Eighteen days mostly cloudy and rainy.
June.....	×57	×73	×65	29.10	29.10	Nineteen days mostly cloudy and rainy.
July.....	×65	×82	×69	29.10	29.20	The whole month nearly cloudy and showery.
August.....	×62	×75	×62	29.60	29.70	Nineteen days mostly cloudy and rainy.
September ..	×55	×69	×62	28.80	29.30	Ten days cloudy and rainy.
October.....	×47	×57	×50	29.30	29.30	Seventeen days mostly cloudy and rainy, with some snow.
November...	×30	×38	×30	19	28.30	Twenty-seven days cloudy, rain, or snow.
December....	×22	×26	×24	29.60	29.40	Twenty-five days cloudy, rainy, or snowy.

PARIS P. O., ONEIDA CO., NEW YORK,
December 15, 1851.

SIR: Having a direct personal interest in the welfare and advancement of the cause of agriculture, and considering at the same time its immediate connexion with the general interests of the country, I have ever felt a willingness, when requested, to contribute as much as possible from my limited stock to the general fund of information on the subject. Present circumstances are such, however, that I must content myself, on this occasion, with a passing reply to some of the questions you have proposed—and that without much forethought or system.

Grass Culture.—The weather during the past season has not been as favorable to the growth of some of the crops cultivated in this region as could be desired. With the exception of a few warm days in the latter part of June, the weather was uniformly cool, much of it cloudy and damp. This retarded the growth of Indian corn, as well as of some other crops; but, perhaps, was not unfavorable on the whole to wheat or grass. Pastures, not having suffered from the extreme heat and drought usually attendant upon our midsummers, continued remarkably fresh during the whole season, to the great benefit of the dairying business, which is pursued to a large extent in many portions of our county; as a consequence, the product of butter and cheese has been much greater in quantity than the usual average, while the quality is quite superior to that of the preceding year.

The hay crop has also been better than the average; and, in fact, is, in my opinion, more abundant than has been harvested for six years past.

Red clover (both large and small) and timothy are the grasses generally cultivated among us, either for hay or pasture. These are sometimes sown separately; but usually a mixture is made, varying in its proportions, according to the varieties of soil or the opinions prevailing among different individuals. My usual practice is to use a mixture of—say 8 quarts of timothy and 8 pounds of clover seed per acre; generally sow in the spring—with wheat, barley, or oats. Two tons per acre may be considered a fair average of the hay crop. Gypsum or plaster is used to much advantage on our upland meadows or pastures as a fertilizer, especially on sandy or gravelly loams. On moist lands we find but little benefit from its application. Much also depends on the season. It is sold at the mills in this vicinity at about $3 per ton. We sow from one to two bushels per acre. So far as my own experience goes, I find no better fertilizer for meadows than a top-dressing of compost or manure, applied either very late in the fall or early in the spring. It is usually more convenient to apply it in the fall, and it may generally be done at that season with less injury to the ground, from driving over it, than in the spring, when it is saturated with the waters of the dissolving snows. As the hay crop is principally raised for home consumption, and in many instances may be considered as coming in somewhat incidentally in the rotation of crops, and the mode of cultivation is by no means uniform, the cost of cultivating it per ton is so variable, that I shall not attempt an estimate of it as an average; it would probably vary from $3 to $5 per ton. In many instances low grounds, too moist for tillage, are occupied as meadow lands. The hay procured from these, although of an inferior quality, costs but little more than the labor of gathering, ad-

ded to the interest of the value of the land. As a more thorough system of drainage gradually prevails, the quantity of such meadows is proportionably diminished.

Wheat.—Winter wheat is not as much grown in this county as formerly. The yield this season, from the few pieces in cultivation, has been fair, and the quality good. From the general uncertainty of the winter wheat crop for several years past, the attention of our farmers is more directed to the cultivation of spring wheat for bread. The Italian, Siberian, and Black Sea are the varieties generally preferred. The first two are sown as early as practicable in the spring, at the rate of two bushels per acre, and harvested from the middle to the 20th of August. The average for the past year may be put at 18 bushels per acre. The Black Sea wheat seems to be better adapted to our soil and climate, and although, in consequence of its small size and somewhat dark kernel, it is not at first received with much favor, it is found, on trial, to be an excellent variety.

The flour does not as much resemble that from winter wheat as does the flour from the Siberian, and is not as suitable for pastry, but is found to make a very sweat and palatable bread; which, if properly made, is not of so dark a color as to be in any way objectionable. This variety, being more free from disease, and less liable to the attacks of insects, is, as far as my experience has shown, the most profitable for cultivation for a family supply of any kind that has been tested in this vicinity. The yield is somewhat greater than that of other kinds, fully averaging this year 20 bushels per acre.

The crop of spring wheat has been better than the average of last year, showing an increase, probably, of 20 per cent. Guano is not used with us in the cultivation of wheat, or indeed of any other field crop. Fresh manures are not profitably applied to spring wheat except on very poor soil, it being likely to induce a heavy growth of straw, with liability to lodge and rust. A field in good heart, from previous cultivation, is considered preferable. As a general rule, corn ground, which has been well manured for that crop, ploughed in the fall, and reploughed in the spring, immediately before seeding, is found best fitted for spring wheat. My own crop of the Black Sea, managed in this way, has yielded the past season 25 bushels per acre, and weighing over 60 pounds to the bushel. It was not injured at all by the Hessian fly or weevil; while other varieties, cultivated in the immediate vicinity, received material injury, particularly from the weevil—in some cases being more than half destroyed. The Black Sea wheat is sown about the 10th of May, and harvested in August, ripening earlier than the Siberian. Quantity sown, 1½ bushel per acre. But little wheat is grown for market, and the price is nominally $1 per bushel.

Indian Corn.—This is an important crop with us; but, owing to the unfavorable season, has not succeeded as well as usual. The cool weather of the summer retarded the growth so much that it was materially injured by our early frosts, except in the most favorable localities. The most approved method of cultivation is planting our sward-ground, manured with coarse barn-yard manure before ploughing, or with well-rotted manure after ploughing, and thoroughly mixed by harrowing. A less quantity of well-rotted manure will insure a good crop, if deposited directly in the hill before planting, at the rate of about 2 quarts to each hill. This method is pursued to a considerable extent. Kinds planted

are the Dutton, white flint, and red glaze; rows 3 feet apart, with hills from 2½ to 3 feet in the row, according to the kind used. The Dutton, being of a larger growth, requires more space than the red glaze, and in favorable locations will yield more abundantly; but, as it requires a warmer season to bring it to full maturity, will not answer in every locality as well as some of the smaller varieties. Ground tilled between the rows with a cultivator, and crop hoed two or three times, according to circumstances. My own method is to plant in rows both ways, at the distance of 3 feet. This admits of a free use of the cultivator, which, if run through frequently in both directions, and worked as near the hill as practicable, renders the labor with the hoe for three dressings comparatively light. The corn is cut up by the ground and shocked as soon as the kernel is glazed—say by the middle of September; husked in October. This method is almost universally preferred to that of topping the stalks, as securing a greater amount of fodder, and as being rather beneficial to the maturing of the grain. The average product of this year is more difficult to be estimated than usual, as, owing to the peculiarity of the season, more was depending on a right location, and other favorable circumstances, than usual. It has varied even on good soils from 20 to 60 or 70 bushels per acre. Forty bushels may be considered as the average. Price, 50 cents per bushel. There being but little called for this season for shipping, what is not purchased by the distillers will be principally fed by the producers. In feeding corn, I am decidedly in favor of using it in the condition of meal. For hogs, its value is materially increased by cooking; for cattle or horses, I prefer having it ground with the cob. In this form I prefer it in the spring to oats as a horse-feed, or at any season when much hard labor is required of the team.

Oats.—The crop of this grain has been very good, showing an increase above that of last year of fifteen per cent. The quantity sown was larger than usual, and the average yield may be put at 45 bushels per acre; some pieces, however, yielding from 60 to 70 bushels. Present price, 32 cents, or one cent per pound. The best crops are obtained from old lands in good cultivation, but will succeed well on sward ground if sown early, so as to become well-rooted before the commencement of the summer drought; quantity of seed, from 2 to 3 bushels per acre. My preference is for the latter quantity, as thick seeding tends to check too luxuriant a growth of straw, and the crop is less liable to be thrown down by heavy storms, and consequently the grain fills better.

Barley.—This grain is extensively cultivated in the southward portion of this county, and always finds a ready sale at fair prices. The quantity sown last spring was probably about the same as usual, and the product about the usual average; showing, however, a slight improvement in the quality, the weather for the final ripening of the grain having been favorable; sown about the 1st of May, and harvested about the 10th of August; the two-rowed variety generally preferred; quantity of seed from 2½ to 3 bushels per acre, according to the strength of the land; succeeds best after a hoed crop, but may be sown on sward ground, if well tilled; requires a warmer and drier soil than oats, and is considered less exhausting to the soil. Barley and wheat are the two best crops where it is desired to seed down to grass. Price of barley, delivered at the canal, from 63 to 75 cents per bushel; the former has been the

ruling price since harvest, except for a short time, during which it was run up by speculators. Product from 25 to 35 bushels per acre.

Peas and Beans.—These are cultivated to some extent, but not as renovating crops; the former for feeding, and the latter for market. Peas were formerly found well calculated to set the ground for a crop of winter wheat; but since the cultivation of that grain has been, in a great measure, abandoned, there has been a corresponding decrease in the quantity of peas sown. Beans are more largely planted than formerly, and it is believed have generally afforded a fair profit. The average product not known. Price from $1 to $1 25 per bushel, according to quality. The small white generally planted; other kinds occasionally.

Tobacco.—The production of this article is at present a mere experiment with us, although its consumption is by no means so. Very few attempts at its cultivation among us were made in former years, and then only on a very small scale. The past year has, however, shown a very material change in this respect, and several have been induced to enter largely upon its cultivation, with a confident expectation that it would afford remunerating profits. Whether these expectations will be realized, or to what extent, it is yet too early to determine, as the crop is yet to be marketed, and the early frosts of the fall injured some pieces materially, but, I believe, not to the extent that was at first apprehended. I understand the encouragement has been deemed sufficient to warrant future attempts in the cultivation; and further experience will, no doubt, enable those engaged in this branch of industry to prosecute their labors more successfully hereafter. A rich, warm, alluvial soil seems to be most favorable to insure success; and as it is found essential that the plants should have as early a start as possible in the spring, they are first planted in hot-beds, and subsequently transplanted at the proper season.

Potatoes.—The potato was formerly largely cultivated in this portion of the county, and was found highly valuable to the farmer for many purposes. Our soil being well suited to produce it in perfection, the annual crop was such as rendered it a cheap article of feed for either cattle, sheep, or hogs, and, in proper quantities, was thought beneficial to the horse. The product from an acre was such as to make it more profitable for such uses than the amount of grain that could usually be obtained from the same quantity of land; the quality being, at the same time, superior. Any surplus we might happen to have of the finer varieties was generally sought for in seasons when there was any demand from other portions of the State, and frequently found a market, even in other States, at prices which would warrant transportation.

Since the appearance of the disease, which prevailed so extensively for several years past, the quantity planted by us has been gradually diminishing, until it is now less than one-half what it formerly was; and the aggregate product has suffered a still greater proportionate diminution, probably not exceeding one-fourth what it was previous to the appearance of the disease. Still it has been cultivated in many instances the last season at a profit, the average product being near 100 bushels per acre, worth from 44 to 50 cents per bushel. The crop has furnished better profits this season than in 1850; the tubers being less affected by the rot, the yield of sound potatoes was, consequently, greater; and a failure of the crop in some portions of the State west of us has caused an advance in the price; so that, although the quantity is still much less than

was formerly obtained, the increased price compensates, in some degree, for the diminution in quantity to those who raise for market. This, of course, cannot benefit those who plant only for their own use; and to the poor, who formerly, in so many instances, relied on the product of their little potato patch as an important means of support for themselves and families, and who in times of scarcity made this root their principal article of diet, the potato rot has proved a most serious calamity. But it is not in the diminution of quantity alone that we have suffered; the quality has, at the same time, deteriorated. The varieties which were formerly the greatest favorites, such as the pink-eye, the Mercer, and English white, being found to be more liable to be affected with disease than some others, have been nearly abandoned, and, in the effort to obtain more healthy kinds, quality has been, in a great measure, overlooked, and to that extent that it has now become quite difficult to procure what we would formerly have considered a first rate article for the table. As to the cause of this singular and destructive disease, which, cutting off as it does one of our most valuable and healthful products, must be considered as one of the greatest calamities that have befallen us for many years, I must confess I am as much in the dark as ever. No examinations or experiments I have been able to make (and these have been numerous) have thrown any light on the subject; and no theory, as yet made public through the medium of the press, or otherwise, has satisfied my mind in relation to it. The effects of the disease are, it is true, sadly apparent to us all; but the real cause is, I imagine, yet to be ascertained; and, until that important discovery is made, no certain remedy will be likely to be found. Palliatives may indeed be applied, that, under certain circumstances, will seem to produce favorable results; while, under different circumstances, they will be found of no avail whatever. The application of lime, ashes, charcoal, coal dust, together with mowing the tops on the first appearance of the disease, and several other remedies, which from time to time have been so strongly, and often confidently, recommended, I have tried faithfully, but, alas, fruitlessly. Early digging, in dry weather, which has been supposed by some to be a security against loss, has been tried also—sometimes with apparent success; but in other instances the tubers thus secured, and deposited in the cellar in a perfectly dry and apparently sound condition, and carefully attended to, have subsequently been diseased to that extent that it became necessary to remove the whole of them together—a mass of putrefaction. During the past season, the commencement of the disease manifested itself upon the leaves and stalks at a period so early that an entire failure of the whole crop was anticipated; but in this instance the disease seems to have assumed a new phase, and, contrary to all former experience, it was found, on digging the crop, that it was far less diseased than in 1850, when the first symptoms appeared at a period considerably later in the season. The result of all my experience has taught me only this: to select varieties which have heretofore been found the least liable to disease; to avoid the application of fresh manures; to plant early, on a dry, light soil; give suitable after-culture; and then be thankful for such a crop as may be granted me. Still I am not without the hope that, in this enlightened age, the true cause of the disease will yet be discovered, and the suitable remedy devised; and whoever shall be so fortunate as

to make the important discovery, may certainly claim to be considered as one of the greatest benefactors of the age.

Carrots have been found a valuable substitute for the potato for feeding; and the cultivation of this root is gradually increasing from year to year. As it is produced for home consumption, no individual has, to my knowledge, gone into it very extensively. The yield varies from 600 to 1,000 bushels per acre. The cultivation of an acre requires much more labor than the same quantity of ground in potatoes; but as the carrot may be sown in drills as near as 10 or 12 inches, the yield is much more abundant. Among the different varieties, the long orange carrot is considered as entitled to the preference.

Fruit.—The cultivation of fruit is receiving increased attention; indeed, all are ready to admit that it has heretofore been too much neglected. Our climate is not well suited to the peach; and the plumb and cherry are much affected by the black knot, which, if not attended to thoroughly, soon destroys the tree. The fruit is also liable to be destroyed, or much injured, by the curculio; consequently, these are serious drawbacks upon the cultivation of the stone fruits. With the apple and pear, however, it is quite different. These may be produced in great abundance, and in the highest degree of perfection. The land appropriated to an orchard of judiciously selected varieties of fruits, if properly managed, can be made full as profitable as by any other use to which it can be applied in proportion to the amount of labor required. Indeed, in most seasons, there are but few crops that would furnish anything like an equal profit in proportion to the quantity of land occupied. Although the other fruits may, in time, be made profitable, as yet our principal reliance as a market fruit has been the winter apples. These, in favorable seasons, are beginning to be produced in large quantities, and usually find a ready sale. Many thousands of barrels have been marketed in a single season from this and the adjacent towns, and the quantity is rapidly increasing; but, notwithstanding the increased production, the demand seems to increase in about the same ratio—the prices remaining as good as the average of former years.

The varieties most generally cultivated among us for winter use, as being most valuable for that purpose, are the Rhode Island greening, the Esopus Spitzenberg, the Baldwin, and the English and Roxbury russet. The Newtown pippin does not succeed well vith us; and the northern spy, though highly recommended, has not, as yet, been sufficiently tested, although I think highly of the apple as an article of food for stock. Still, with the knowledge now possessed with regard to the cultivation of fruits, the farmer who shall be so neglectful of his apple orchard as to permit the growth of any considerable quantity of such varieties as cannot be used more profitably than in feeding to hogs, or cattle, is certainly guilty of a great oversight. No one, it is presumed, will claim that a bushel of apples contains as much nutriment as a bushel of corn; and yet, with proper care, the quality of the fruit may be made such as to command an equal price in market. Still, as, owing to a variety of causes, some portion of the fruit of each year will be found of a quality unsuitable for market, notwithstanding the greatest amount of care has been bestowed upon its cultivation, I know of no better use to which it can be applied than that of feeding. Given prudently to milch cows, apples induce an increased flow of milk; to sheep, removed from their pastures

to dry fodder, they appear to be a great luxury, and are highly conducive to health, if given in moderate quantities; and, for wintering swine, I consider them far preferable to raw potatoes; indeed, I am inclined to believe, from some facts that have fallen under my observation, that if a selection were made of varieties best adapted to that purpose, apples would be found fully equal in value to the potato for feeding to swine, in any manner in which the latter vegetable might be prepared. As a general rule, sweet apples would, no doubt, be found most valuable for this purpose. Still, I would not make my selection wholly from them, for the appetite of the animal should surely be allowed to have some influence on the decision; and I have frequently observed that, when allowed to select at will, in an orchard where the different varieties were accessible, the pig often manifests a preference for a sour apple, or one moderately tart, if it is rich and juicy. With such a chance for selection, I have known pigs to thrive more rapidly than those of the same litter confined in the sty, and attempted to be fattened on boiled potatoes and pumpkins, mixed with milk, and made as palatable as possible. I would say to the farmer, cultivate none but the best varieties of apples; it costs but a trifle more to raise the very best than it does to produce the inferior varieties. If your trees are old, and still vigorous, but yielding inferior fruit, renew the tops by grafting, and you will soon reap a rich reward. If the tree is decayed or unhealthy, remove it at once, and let its place be supplied with one that will be worthy of your care, and not a mere cumberer of the ground. Then, if the time should ever arrive when the markets should be glutted to that extent that you cannot make a sale at a remunerating price, you will still find that your labor has not been in vain; you have secured for yourself and family, during most of the year, a palatable and healthy treat; and for the surplus, even your swine grunt forth their gratitude to you while they luxuriate upon the luscious repast.

I have, sir, thus hastily touched upon some of the subjects to which you have done me the honor to call my attention. Owing to the disadvantages under which I labor at present, in consequence of ill health, I confess I have not been able to do this in a manner satisfactory even to myself. Were I able, I should be happy, not only to reply to several of your inquiries which I am now compelled to pass without notice, but also to remark upon the cultivation of some crops grown in this county which I do not find in your list, viz: hops, teazles, and broom corn, all of which are cultivated to a considerable extent with us, and usually yield good profits; but as I have already exceeded the limits I first proposed for myself, I must close.

Wishing you abundant success in your really important undertaking, I am, dear sir, very respectfully, yours,

LORENZO ROUSE.

STATE OF NEW YORK, CAYUGA COUNTY,
December 1, 1851.

SIR:—Your Circular, requesting agricultural information, was duly received.

Wheat is the leading crop in this section. I am not aware that guano used to any extent as a fertilizer in the production of any crops.

The great fertilizers here are stable-manure, plaster, and clover; the former at the mere cost of hauling. Plaster is obtained, by hauling a few miles, at $1 50 per ton. The usual method of raising wheat is on the three or four rotation system. The last of May, or the first of June, turn under a clover crop that is leg deep, (the more clover the better.) Plough twice afterwards, with an occasional harrowing or working with the cultivator. The time of seeding is from August 20 to September 10; quantity of seed, from 1½ to 2 bushels per acre; time of harvesting, from July 25 to August 10. In the spring, after seeding with wheat in April, it is seeded with clover, at the rate of about 15 pounds per acre, and plastered with a bushel of plaster. The second spring it is plastered as before. On the last of June the clover is cut for hay, producing from 1½ to 2 tons per acre; the last of August, or the first of September, a crop is cut for seed; yield, from 3 to 4 bushels per acre, which is worth from $5 to $6 per bushel. The yield of the wheat crop thus managed is from 20 to 30 bushels per acre, and is worth from 88 to 94 cents per bushel.

Corn.—This crop is raised more or less by all farmers. Stable-manures, ashes, and plaster, are used as fertilizers in the production of this crop. I have no data to fix the cost of production. The best system of culture is to plant early, (from the 5th to the 10th of May,) on rich land, and keep the crop clean. Yield, from 40 to 80 bushels per acre, which is worth from 46 to 54 cents per bushel. My own experience in harvesting is to cut up the corn at the ground when the earliest ears are glazed, and shock it up. After curing, harvest it; and if the stalks are well taken care of, they are worth as much for stock as a proportional crop of hay from the same land. These, cut with a suitable machine, have their value increased from 20 to 30 per cent. The corn I consider is worth as much more for grinding as the stalks are for cutting.

Clover and Grasses.—From 1½ to 3 tons are produced per acre. Plaster is the cheapest and surest fertilizer for meadows and pastures; for upland, clover is best; lowland, designed for pasture, requires timothy and red-top, at the rate of 6 quarts per acre.

Dairy Business.—This branch of rural industry has claimed our attention for years. As a general rule, in small dairies butter is made in the spring and fall, and cheese during the warm part of the summer. To determine the quantities, many things are to be taken into the account—as difference in cows, in keeping, and many other local causes. We consider that good cows, kept right, should make from 200 to 300 pounds of butter, or double that quantity of cheese.

Our method of manufacture is so similar to the thousand statements annually published, that it would be but a repetition to repeat it. The points, then, where most fail, and different opinions exist, are these, upon which I shall only dwell: In freeing the butter from the milk after churning, which we do with the hand-ladle, without water or washing, with as little working as will effect the object, none but the purest salt should be used—an ounce being sufficient for a pound of butter—which we add at the first and last workings. The Liverpoo ground salt of the Ashton brand we consider as good as any. When sufficiently freed from the milk, it should be packed in good (hard wood) oak firkins, made tight, and previously soaked (24 hours or longer) in

strong brine. The air should be excluded as much as possible during the filling, which should be done in a cool place. When full, put a fine white cloth over the butter, and a thin layer of salt over that, and head up the cask. Butter thus made and packed has kept, and improved as long as kept. We consider that butter improves by age as much as cheese. When butter is made by churning the milk or cream, it should not stand more than 36 hours before it coagulates; and hence it will be observed that in cold weather it is somewhat difficult to keep a room at a temperature high enough to effect that result. Our method is to scald the milk, when strained, in the pans, by setting them on the stove. Should it freeze, skim it immediately. The butter is equally as sweet as May butter, and is not as white as when otherwise managed. Price of butter, 16 cents; of cheese, 7 cents.

The culture of fruit is receiving increased attention, and I have no doubt it can be made a profitable crop. I consider apples to be worth as much, by weight, for feeding stock—cattle, hogs, or horses—as potatoes. The culture of peaches, pears, and apples is being largely extended, and the demand is steadily increasing. The varieties most desirable depend much upon the place and the use to which the producer designs to put them.

Very respectfully your obedient servant,

BENNETT RADFORD.

Hon. Thomas Ewbank.

Clifton, Monroe County, New York,
December, 1851.

Sir: In this section guano is not applied to any crop, except it be by gardeners. The only manure for wheat is green crops and barn-yard manure.

Wheat.—The best varieties of wheat are white flint and soles wheat. The soles is esteemed, under favorable circumstances, to be the most productive; is an earlier grain than the flint; has a stiffer straw; will do to sow later, and harvest earlier; but is an easy grain to shell; consequently, must be cut before it is fully ripe, or much is lost in harvesting. The kernel is plain, and of a bright color, and makes a fine article of flour. The flint is more liable to lodge on rich land, but not as liable to waste in harvesting; it makes the best of flour. Where a large crop is sowed, I think the farmer would find it to his interest to cultivate both kinds. Our wheat produces from 20 to 40 bushels per acre. The time of seeding, from 10th to 20th of September.

I commenced harvesting my last crop the 21st of July. I had a heavy crop. My flint was lodged so that the greatest part had to be cut by hand, and some of it by sickles. My soles wheat stood up so that I cut it by horse-power. I used one of Seymour and Morgan's reapers. My wheat is not all marketed; I therefore cannot state the average per acre.

The preparation of seed that I prefer, is to have it clean from all other seeds and smut. For the last two years I have ploughed but once for

wheat or corn, and then follow with harrows and cultivators. I have used Ides's wheat cultivator, which has worked well on my land.

You ask whether the yield is on the increase or diminishing. In reply I would say that I obtain greater yields than for ten years past. I think this is the experience of most of the farmers in this vicinity; yet there are men in this county, as well as elsewhere, that will waste their manure and impoverish their land. I think that the manure that can be saved on one hundred acres of land that is suitable for wheat, if properly applied under good management, will prevent a decrease of crop.

Corn.—This is a valuable crop, and next in importance to every farmer to that of wheat.

My practice is to cover the land intended for corn with coarse manure from my yards, that have been kept with and littered with straw, where my sheep have left their droppings, together with what has been taken from my stables, (which is not a small pile, for I stable all my horses, oxen, and cows.) When the ground is dry enough in the spring, I plough about 8 inches deep, and turn the manure under. If I cannot do it without, I have a hand with a rake to follow after and rake the manure into the furrows. When it is well ploughed under, I have a heavy roller passed over it; then harrow it lengthwise the furrows; then go into it with a wheat cultivator, set it so as not to disturb the sod, and work it till it is mellow on the surface as deep as I can and not disturb the manure and grass that is turned under; then mark the ground both ways three feet three inches apart; then plant five or six kernels in each hill. As soon as it is up, so that we can follow the rows, I start a corn cultivator between the rows, rolling it both ways. After this, go over it again in like manner, and follow with hoes and dress it out, leaving four plants in a hill.

If circumstances will permit, I would say, continue to work it with either plough or cultivator, until the corn shades the ground, so as to keep the weeds down. After the corn is off, I have found that the succeeding crop is more benefited by the manure than the corn. I think the best method of feeding corn to make pork is, to cook it. My practice for some years past has been to shell my corn, and fill a potash kettle half full with it, then fill it with water to the brim; then boil it until the water is used up. When this is done, the kettle will be full of corn. This, I think, is better than grinding, to say nothing about the *toll*.

I never applied the manure for any given quantity of corn, so as to be able to state what the increase of grain would be by applying the manure from the hog-pen.

Oats are grown to a limited extent. I have taken but one load of oats to market since I have lived on my present farm, and that was some 15 or 20 years ago. They are usually fed to teams on the farms on which they are grown.

Barley is used by some in rotation between corn and wheat.

It sometimes produces well, but I do not cultivate it, nor other grain that has beard. These will penetrate into the fleece of wool, so that it will be impossible to free the wool from them, if the straw is put into the yard where the sheep are kept.

You ask, Is *wool growing* profitable? I would say, to a limited extent it is, on wheat-growing farms.

More sheep can be profitably kept in the winter than in the summer. Too close feeding in summer is calculated to reduce the prospect of a subsequent wheat crop on the same land. Sheep are useful in winter to help reduce the straw stack to manure. This should be done by spreading the straw daily in their yard. They should not be allowed to go to the stack and help themselves, as is sometimes the case. In so doing, they will be apt to get straw and chaff worked into their fleeces. That will damage their wool.

Sheep will winter well on hay once a day, and straw twice each day. To those that I wish to fatten, I add a feeding of corn once a day.

Sheep should have a daily supply of water through the winter, as often as any other animal.

My post-office is Clifton, Monroe county, New York.

Most respectfully, yours,

ASHBEL A. HOSMER.

Hon. THOMAS EWBANK,
Commissioner of Patents.

ROCHESTER, MONROE CO., N. Y., 1851.

SIR: In compliance with your request, embraced in the Patent Office Circular of August, 1851, I offer you such facts as are within my knowledge, and the various processes of husbandry that prevail in western New York.

Wheat.—Guano is not used as a fertilizer for wheat in this region, and only very sparingly, for experiment, on any other crop; and, as far as I am advised, it has not met the expectations of the users. The principal fertilizer for wheat is clover, with plaster, and a proper rotation. Barn-yard manure, with the surplus straw put in heaps and properly handled, is also used on summer fallows; or fresh manures applied to the corn crop, and, after the corn is taken off, immediately ploughed and sowed to wheat. What by many is thought a better process, is to follow a manured corn crop the next spring with barley, and the barley with wheat, and seed down with clover. The rotation most prevalent is to allow the field to lie in clover one or two years, and, if there are still foul grasses, to summer-fallow by three ploughings; or, if a clean clover, lay or mix with timothy grass, turn under the middle of June, and subdue with the cultivator often. Many persons, who are short of meadow, mow the clover early, and allow it to bloom again, and turn it under the first of September, and immediately sow to wheat. Both of the last processes are rapidly prevailing, in preference to the old summer fallowings, or three ploughings; and, if properly performed, succeed equally well at half the expense. The season of sowing is from the 1st to the 20th of September, at the rate of one and a half bushel per acre. When *drilled* in, one bushel is found to return as much per acre as the one and a half sown broadcast, owing to being better covered; producing a more perfect vegetation; standing the winter better, from having deeper-planted roots, which is an important consideration; and saving enough in seed to bread the entire population of the wheat-growing community. Very late sowing is the only preventive known against the fall attack of the *Hessian fly;*

for its inroads in the spring, there is none. When they greatly prevail on a single field, ploughing under the stubble immediately after harvest, and following with wheat on spring crops, destroy the entire progeny of that locality; but it must be done before the *larva* changes into the fly.

The *weevil* (wheat midge) is now commencing its ravages, for the first time within two years past, in the great wheat district west of Cayuga lake. Its attacks, as yet, seem to be confined to late crops and the belated portions of early crops; and it is hoped that, from the use of early varieties, and from the favorableness of our seasons, it will not obtain extensive foothold in this region.

It is augured that the security in having early varieties and forward growth consists in the fact that the chaff of the kernel passes the state of softness required by the insect to deposit the *ovum* of its future progeny.

The earliest varieties that produce well in this climate are the *soules*, or sowles, and the Hutchinson or bearded Kentucky. Many persons, in districts where the weevil prevails, are resorting to the Mediterranean wheat, in consideration of its early maturity, a coarse variety abounding in *gluten*, and making a flour not unlike spring wheat.

The average price for 1851, is about $1—88 cents lower than it has been for some years.

Indian Corn.—Guano is not used on this crop; as a top-dressing, plaster and ashes are generally preferred. Corn is generally made with recent coarse barn-yard manure, ploughed under, or on green sward, turned over, harrowed, and immediately planted; but the best crop on foul swards is made by fall-ploughing, as late as possible, and harrowed in the spring at the first appearance of the starting up of the grass. Immediately before planting, cover with coarse manure, and cross-plough under, and thoroughly drag it and plant.

This course will give a greater yield and a cleaner field than any other process. This region is not strictly a corn country; wheat being found much more profitable for the labor expended. The average produce is about 35 bushels per acre, although 80 and sometimes 100 bushels are produced.

Corn is the most labor-absorbing crop that is raised in the northern States; but, being made mostly at periods when little other farming work is pressing, and being an important item in family husbandry, every farmer raises enough for his own use at least.

The old process of ploughing and hilling in hoeing is fast giving way to the use of the cultivator and flat dressing. *For feeding*, there cannot be two opinions as to the advantages of grinding, and even cooking, food for fattening animals; as the process relieves the animal economy of so much of that labor which it has to go through in the stomach before assimilation takes place. Another fact appertaining to the subject is conclusive: *no seed or grain is, or can be, digested at all, if unbroken;* but, in all cases, passes the animal whole. This rule holds good with all vitality excepting birds.

Without any close experiments, or reliable criteria for judging, it may be assumed, as near the truth, that the manure from 10 bushels of corn fed to hogs, if bedded with a sufficiency of straw, or other vegetable matter, to absorb the entire produce of the animals, and if properly

secured against the elements, would, if judiciously applied to an acre of corn on poor or worn land, increase the crop from 15 to 20 per cent.

Oats.—A cheap made crop in this region, and not liable to many diseases or mischances; but a heavy feeder on the soil, and a bad crop to lay down with clover, as the foliage is so heavy that it shades and chokes out the young grasses; consequently, a poor rotation for fertilizing. The average price is this year about 37 cents.

Rye.—Rye, as a crop, is hardly known in the wheat districts.

Peas, on some soils, are profitably cultivated as food for hogs only. The pea bug attacks them so freely, that the seed has to be obtained from Canada, where the pest is not known. Many persons cultivate peas as a renovator of the soil, under the mistaken idea that it adds positive qualities. It is true it is a fine preparation for wheat, a light feeder, leaving the land light and free from weeds; but that the taking off of several tons per acre of its fat and muscle can add anything to its producing properties is preposterous. Yet a field in naked fallow, without grasses, had better be under the pea crop than remain exposed to the elements.

Beans are occasionally cultivated, as a crop, on light and thin soils, but to no great extent. Almost every farmer, once in a year or two, raises a small patch for family use.

Clover and Grasses.—No farmer, with the least pretensions to understanding his business, ever lets a wheat crop pass without seeding with clover, which, in this climate, is generally sown in the spring, on the last fall of snow, or before the heaving and lifting of the soil by night frosts are passed, whereby the seed is carried into the earth and covered. Many persons mix timothy seed, at the rate of 4 quarts to the acre, when they intend to mow it; and there is no objection to the grass, as it only increases by offsets, and dies like clover when once turned under. Old meadows are best renewed by a top-dressing, in the fall, of a good coat of manure, and well dragged with a strong team and loaded harrow in the spring.

A system of irrigation, when circumstances will permit, is an important process for producing hay. Low and mucky meadows, which are intended for hay alone, are best laid down with red-top, one of the best cattle-hays known, a great yielder, and will stand good till after harvest. The quantity of clover seed sown is generally about 6 quarts to the acre, though many sow double that quantity, with profit over the cost of seed. The quantity of hay produced per acre will average about two tons of cured hay.

Dairy Business.—This branch of husbandry does not prevail in wheat-growing districts, as it requires too much land in grass for pasture and for meadow to sustain the stock during our long winters.

Butter and Cheese.—The average prices are about 6 to 12½ cents per pound.

Neat Cattle.—The same reasoning will apply as respects the subject of dairies. The Durhams take on fat the easiest, particularly when young, and the Devons and Ayrshires, and natives, or crosses between them, are generally the best milkers.

To break Steers.—Handle them freely the summer and fall after they are one year old; and before they are two, use them freely to a light yoke; and the winter they become three, break them thoroughly to light work, with a quick step and without noise.

Horses.—There are a good many raised in this region, both for profit and from necessity; as, in a wheat-growing community, there are more horses than men. The cost does not exceed $35 to bring them to three years. The raising of mules is not known.

Wool.—Wool is not extensively grown in this district, although every well-managed wheat farm should have one sheep to every arable acre; yet, not having much experience in sheep husbandry to any notable degree, I cannot speak with any precision as to the other question.

Hogs.—The best breeds are Berkshire and Leicester, or a cross between them. They are usually fattened at from 12 to 18 months old, and weigh from 200 to 400 pounds. They are first fed on cooked potatoes, apples, pumpkins, &c., and finished off by a month's feed of corn in the ear.

The best and most expeditious method for fattening hogs is, to keep them in good clover pasture till the middle of September; then house and feed them with ground peas and barley, or barley-meal alone, cooked or sowered in tubs. It will make pork quicker and cheaper than any other process, and of the finest quality.

Root Crops are considerably, though not generally, cultivated, owing to the amount of hand-labor required.

Carrots are the prevailing crop, and much the most valuable, particularly for horses and milch-cows; and stock or store-hogs winter respectably on them alone.

The premium crop for this State, in 1849, was within a fraction of two thousand bushels to the acre—showing that the amount of nutriment exceeded the produce of fifteen tons of hay, at two tons per acre.

Potatoes.—The average yield since that inscrutable disease—the rot—will not exceed fifty or sixty bushels to the acre; formerly, a bushel to the square rod, or one hundred and sixty bushels to the acre, was common. Potatoes are not made for less than 25 cents per bushel.

The merino, round pink-eye, and flesh color are the greatest producers; the long pink-eye, mercers, and Foxites are best for eating. Dry soils, or green sward, or fallow land, without stimulating manures, with early planting, are, since the disease, the safest method of growing. There is some pretty good evidence that the planting of potatoes and corn in alternate rows is a preventive of the rot.

Fruit Culture.—Apples, of the best quality, are easily grown in this region; and farmers are extending their orchards, as apples find a ready market both east and west. It is said by some persons that two bushels of apples are equal to one bushel of potatoes, and that two bushels of potatoes are equal to one bushel of corn for feeding; though this estimate is only an approximation. The best winter varieties for this climate are the Rhode Island greenings, Esopus Spitzenbergs, Swaars, Baldwins, Vandeveers, seek-no-furthers, northern spies, Newtown pippins, and russets. The best apples known for exportation are Newtown pippins and russets.

Peaches, and the other fine fruits, succeed in all that part of western New York west of Cayuga lake. There is nothing known of the cause, cure, or prevention of the leaf or yellows in the peach, or fire-blight in the pear. One thing is quite settled, that insect-depredation has nothing to do with it.

Grapes.—The only variety cultivated with any success is the Isabella. The Catawba does not ripen except upon dry, warm land, and all the foreign kinds mildew. The making of wine—veritable wine—is out of the question in any climate not sufficiently genial to develop the saccharine qualities of the grapes sufficiently to make the dried raisin, and generate the tartaric instead of the malic acid.

In this new country, the genius of the people is much more bent upon destroying than planting *forest trees.*

Manures.—Wheat crop is principally manured by a rotation with clover; while the corn and root crops, except the potatoes, come from the recent manures of the barn-yard, which are sometimes fermented in the yards and applied on summer-fallows for wheat. Plaster is universally used for a fertilizer, mostly for its benefits to the clover, as it is a mooted point with our farmers whether it affects the wheat plant at all.

Lime, applied to our western soils, has not, as yet, as far as observation has gone, produced any beneficial results; which is contrary to all experience in all older counties, and can only be accounted for by supposing that our soils contain a redundancy of that material. As an application to recent manures, it is decidedly detrimental, and only beneficial to stimulate or affect vegetable matter.

Your obedient friend,

L. B. LANGWORTHY,

President of the Union Agricultural Society.

To the COMMISSIONER OF PATENTS.

MACEDON, WAYNE COUNTY, N. Y.,
January 10, 1852.

SIR: I send a few brief replies to some of the questions in the Agricultural Circular of the Patent Office, regretting that I have been prevented from furnishing them sooner by unavoidable causes.

Wheat Culture.—A great loss is sustained by most of the farmers in the northern portion of western New York through shallow cultivation. When the land was first cleared of the forests, and the country was new, 40 bushels per acre was a very common product.

Now the farmer is satisfied with one-half the amount. Every one knows the reason of this falling off. The soil has been partly exhausted by bad husbandry of its valuable constituents. But, fortunately, (if the expression may be allowed,) the cultivation has been only of a *superficial* character, and the subsoil has not been injured by this thriftless treatment; hence, what is usually regarded as very bad farming, has at least one redeeming characteristic—it left a part of the riches of the soil for the present race of cultivators. It is to be hoped that when they find out what a magazine of hidden wealth has been reserved for them, they will not waste it, as their predecessors did, by a remorseless exhaustion in cropping. The experiments which have been made under my observation, in efficiently deepening the soil, have all resulted in a most decided improvement. The wheat crop, more especially, has been benefited. Probably, as an average, this increase is not less than one-half made; in some cases, it is more than double.

In one instance, the earth taken from a ditch was spread on the ground for the distance of a rod each side. A year or two after, during a very unfavorable season, when the field generally did not exceed 5 bushels per acre, this strip, dressed with the subsoil, afforded at least 20.

An extensive farmer told me that, so greatly superior was the under soil for the growth of wheat, he would gladly have 6 inches of the top entirely removed from the whole of his farm. Better, no doubt, would it have been to have well mixed the two portions by subsoiling, in connexion with trench ploughing. The Michigan subsoil plough of the larger size, drawn with a strong team, has proved an admirable implement for this purpose.

Sowing Grass Seed.—A great improvement might be achieved by sowing larger quantities of seed. Any one, by walking over newly-seeded fields, may usually discover irregular bare patches, without number, when the growth of herbage does not cover the soil. If these bare portions, however small they may be, singly, were all congregated together without the mixture of grass, the farmer would most unwillingly permit so many bare acres to be idle. A year or two since, the writer sowed a small field early in spring with grass, accompanied with no other crop; it was lightly harrowed in. The seed consisted of equal portions of timothy and clover, and was applied at the rate of *one bushel* per acre. In a few weeks the whole surface was densely covered with a beautiful and even growth of green herbage—not an inch of bare earth was visible. It was pastured that year, and mowed for hay the next. Although the land was ordinary upland, and had never been heavily manured, the crop of dried hay was $3\frac{1}{2}$ tons per acre. Being cut early, a fine second growth followed, which was subsequently pastured. It was estimated at one-half the amount of the preceding crop, which would give the whole growth for the year at *five tons* per acre, and which could not have been far from correct. It should have been stated that a dressing of gypsum was applied early the previous spring.

Breaking Steers.—Very objectionable is the frequent practice of educating oxen to the sound of a loud voice, or a scream, in commanding them, and the free use of the lash in enforcing orders.

A most successful trainer of young oxen, who pursues it as a business, adopts substantially the following practice:

He first secures a number of yokes for economizing his own labor, and encloses them in a yard. At first they are usually wild and intractable. He passes around deliberately among them till they become familiar with his presence, carefully avoiding any movement, as much as may be, which might in the least degree excite fear. He soon finds it easy to stroke them with his hand—at first, perhaps, with a single touch, which they cease to dislike or avoid when they perceive no injury is received. In this way, by degrees, he makes himself quite familiar with them, until he can freely handle them. He then applies the ox-bow, and afterwards the yoke, to which, in like manner, they become accustomed. This is all done by operating but a moment or a very short time on each successively, so as not to annoy or tire them by constant attention. As they become more familiar, this period is gradually lengthened. In order to lead them, the ox-bow is applied to the neck, and drawn with a moderate force. They may at first resist a little; but if no degree of vio-

lence is used, they soon find it easier to advance than to submit to a constant pressure at the neck—on the same principle, precisely, that a tight board fence will resist violent blows, but will yield to the constant pressure of a bank of earth against it.

All these drillings are accompanied, at the proper time, with a low, firm word of command. Ultimate obedience is always insisted on. It is surprising what a change is wrought in the external behavior of a dozen wild steers thus treated, in the course of a few days. When the process is completed, they become the best broken oxen I have known; mild, tractable, prompt in obeying, and, above all, not needing a hoarse bawl, nor a lashing whip, on the part of the driver, to enforce orders.

Very respectfully,

J. J. THOMAS.

Hon. THOS. EWBANK,
Commissioner of Patents.

SENECA COUNTY, NEW YORK,
December 20, 1851.

SIR: After consulting with some of our practical farmers, and obtaining such information as I could in relation to the subjects embraced in your Circular, I will endeavor to answer it accordingly.

Wheat, with us, is a principal and leading crop; the mode of tillage, a clover-lay of from one to three years, ploughed a good depth. If ploughed again, it should be equally deep, and use the drag or cultivator frequently. Many of our best farmers plough but once, and do the after-tillage with the drag and cultivator, the crop being equally good, and leaving the turf and a great portion of the foul seed below. One other benefit: the soil is less likely to run together and become hard in those extremes of wet and dry so frequently seen in the spring. Much of our land tilled in either of those ways will, in good seasons, with no destruction from insects, yield from thirty to forty bushels to the acre. Breaking up or ploughing to be done by the middle or last of June; best time to sow, from the 10th to the 20th of September; quantity of seed to the acre, $1\frac{1}{2}$ bushel—some prefer more; wheat for seed should be put into the mow dry; if damp, a fermentation ensues, which may affect its germination, and also have a tendency to generate smut; when threshed, clean it of all foul seed, and, if the ground is not too dry, wash it in brine and lime before sowing.

The average yield of wheat, for all sown in this county, is estimated at from 16 to 18 bushels to the acre; in 1848 it was 18 bushels—some of the towns 20, and one (Ovid) 25. The above estimates for common seasons, and with no extraordinary injury by insects; our average ought to range much higher, and would if we would abandon the system of stubbling in.

Cost per acre, including seed, harvesting, and threshing, is estimated at $10; time of harvesting generally about the 20th of July; cut a little before fully ripe. Price, since harvest this year, for white wheat of good quality, 65 cents; varieties most sought for are Soule's, Hutchinson, and white flint.

The yield this year is less than usual; the damage done by the weevil is estimated at from 20 to 25 per cent. Spring wheat has been cultivated to good advantage. When done, the ground should be ploughed in the fall, and sowed as early in the spring as it will do to work; if in March, all the better; but as the weevil seems to injure this more than winter wheat, it will become a question of expediency whether to sow any.

Sowing winter wheat at the times above stated, or at the time of light frost, is thought by many of our observing and experienced farmers to be a remedy against Hessian fly; and some have thought an early spring and harvest a remedy against weevil. The Mediterranean wheat ripens much earlier, and, although injured to some extent, it was much less than other varieties; but its average yield is less, quality inferior to, and duller in market than the white.

Corn.—The cost of raising Indian corn is estimated at seven dollars per acre; average yield about thirty bushels—in some instances, 75 to 90 bushels. Best course of tillage, a green sod, ploughed in the fall; plant from the 1st to the 15th of May; till with the cultivator and the *hoe*. For feed it is better ground than whole; and for hogs it is better cooked. Crop last season below common average price of fifty cents.

Rye not much cultivated. Peas and beans very little, if any, more than for culinary purposes.

Oats.—Average yield, 36 bushels to the acre; amount of seed, 2½ bushels; cost, $5. This year the yield is above an average; price in market, 36 cents.

Barley, the last year, has been a full average crop—say from 20 to 25 bushels to the acre; cost of raising about the same as oats, and, it is thought, less exhausting to land. Both these crops do best on corn stubble; if sowed on sod, it ought to be ploughed in the fall; price this season, 70 cents.

Buckwheat is somewhat extensively raised; in 1848 the whole amount was 704,940 bushels; average produce per acre 15 bushels; cost per acre $3 25; this year the yield to the acre a full average; market price 37½ cents. This crop is considered one of the most renovating of our grain crops, and, next to corn, the best purifier from foul weeds.

Hay.—The quantity cut per acre is a full average, over 1½ ton, the season having been favorable to that crop; cost per ton $1 25; market price $6. Best fertilizer for meadows, plaster, with a mixture of ashes—say one-fourth; in laying up land for meadow or pasture we prefer clover seed, about six quarts to the acre, and some add a little timothy; for interval or muck land, timothy, with about one-third clover.

Average yield of clover seed is said to be two bushels and one-eighth per acre this year, above a common average; price, $4 50 to $5. Mode of tillage for early clover: some pasture close and take out by the 1st of July, then cut the second growth for seed; others mow the first crop of grass from the 1st to the 4th of July, and then mow the after-crop for seed. This course is thought to get it more pure.

Of the *Dairy.*—This being a grain-growing county, not as much attention is paid to some other departments as should be. Very little cheese is made; of butter, some more than is required for domestic consumption, and of a good quality; when sold in the market it is generally put

up in firkins of about 90 pounds; price the present season, 14 cents. It is estimated that a good cow will yield 150 pounds in a season.

Cost of raising *neat cattle* until three years old is variously estimated at from $20 to $25—and that, too, is their estimated value; at that age the profit in raising them is that they are kept much of the time during winter on straw and other coarse provender, not saleable, and should not be sold if it was, and which by this means is converted into a marketable article, without any detriment to the farm.

We have the short-horn Durhams of good blood, the Devons, and the native breeds, and a mixture of the whole. The Durhams are esteemed the best for fatting; a cross of Devons and Durhams next; the Devons and a cross of our native breeds the best for working oxen; and although some of the Durhams are good milkers, the natives, as a whole, are thought to be the best. To acquire full and healthy developments, young cattle should be kept well the first year.

Horses.—The stock is good. To rear a colt to 3 years old will cost $30 to $35, when his value will be from $55 to $75; and when fully matured and broke, will range from $80 to $150. We are now getting a cross of the Morgan stock, which promises to give more figure and action, and will add to their value for market horses, if the size is not diminished. Colts, as well as neat cattle, should be kept well the first year; brood mares, if gentle, are worked moderately in the after-part of the season; turned into the yard during the winter; and a few meshes of bran or unbolted wheat-flour given to them about foaling time.

Wool-growing is said to be profitable, with proper care, and sheep of the right kind. The difference in the cost of producing a pound of merino, as compared with a pound of ordinary coarse wool, is in favor of the former. Merinos retain their fleeces better until the time of shearing; give a heavier yield; the price is higher; and, being fuller clothed, they stand the changes of weather better, and are not so liable to disease. It has been estimated by practical men that 12 tons of hay, or its equivalent, are sufficient to keep 100 common-sized Saxon or merino sheep through the foddering season; or 3 per cent. of the weight of the sheep, per day, will suffice.

Then, estimating the hay at $6 a ton, and assuming that the increase and growth of the flock will pay for the summer keeping, which most of our farmers think they do, and estimating the wool at 40 cents a pound, with a yield of 3½ pounds to the fleece, it leaves a profit of $68 on 100 sheep. Some of the butchers say that sheep of medium size—from 60 to 70 pounds, and from one-quarter to one-half merino—are the most profitable for mutton; they show more fat when opened, and the flesh is better, generally, than the common stock of larger size.

The sheep of this county are mostly merino, of good quality, being thought more hardy than the Saxon, and more profitable than the coarse wool; average yield of fleece 3½ pounds; average price the last season 40 cents per pound.

This branch of husbandry, like some others, being of secondary importance, does not receive the attention it should; for want of proper shelter, the comfort of the flock is too often neglected, and too little care is taken by many of our farmers in selecting ewes for breeders; for these we should select the round chested, with full shoulders and good hind-quarters, and either sell those of different form or keep them from the

buck; then, with judicious crossing, our flocks would continue to improve.

Of *hogs*, the breeds most esteemed are the Berkshire and Leicester, as being least expensive to fatten; and, by crossing, the size of the former is increased, while the properties to lay on flesh are not diminished. We have another stock or kind imported from China, which, when crossed with the Berkshire, improve both; they fatten very easily, and attain a good size.

The cheapest method of making pork is to swill the hogs liberally during the summer; let them glean the stubble, and run in the orchard; then feed them with potatoes, boiled, mixed with corn or other meal; feed them, as it is husked, with the refuse or unsound corn, and then give them, for a time, corn-meal or whole corn. Very little pork is put up, except for domestic use; it is now sold in the carcass, and sent to New York; present price, $5 50 a hundred.

Average yield of *potatoes*, 80 bushels to the acre; cost of raising, $6. The difficulty of raising, and uncertainty of preserving, this crop, of late years, have reduced its production to very little more than is necessary for the use of the table. Crop this year below an average, but is said to be less affected with disease; price per bushel, 50 cents.

Carrots and Beets (mangel wurzel) have been cultivated as field crops, and produced well; but the amount of labor required, it was thought, rendered them unprofitable.

Fruit.—Our soil and climate are both favorable to the cultivation of fruit; and some years past increased attention has been given to its improvement by pruning and grafting the apple orchards with what were supposed to be the best varieties, though, unfortunately, they did not prove to be so.

The committee of the State Agricultural Society for 1847, to whom were referred the selection of apples for domestic use and exportation, to be cultivated in the State of New York, say: "The varieties of apple which the undersigned have selected and recommend to the society, under the resolution of 1846, are as follow:

"Early harvest, early strawberry, large yellow bough, early Joe, and William's favorite; all which are summer apples.

"Fall pippins, golden sweet, Gravenstein, Jersey sweeting, Porter, Rambo, Detroit red, and Bellebane; for autumn uses.

"Baldwin, yellow bellefleur, Hubbardston, non-such, Jonathan, Newtown pippin, northern spy, blue pearmain, Rhode Island greening, American golden russet, Roxbury russet, swaar, ladies' sweeting, Talman's sweeting, Esopus Spitzenberg, Vandevere, waxen apple, Westfield, and seek-no-further; for winter use and exportation."

In relation to the value of apples for feeding stock, the same committee say:

"Aside from its edible uses to man, the apple is an important and economical food for most kinds of farm stock. Milch cows thrive upon them when fed in moderate quanties, and they add to the quantity and quality of the milk. They are also an excellent food in making beef. Horses eat them rapidly; for them they constitute succulent and healthy food. Sheep, swine, and geese will fatten altogether on good apples; and for all kinds of poultry they are desirable and nutricious food. The best varieties, too, are as comparatively valuable for stock feeding as for market purposes; and for stock-feeding alone, the best varieties of both sweet

and acid should be cultivated. Indeed, for stock-feeding solely, no cheaper, more convenient, or valuable *green* food can be grown, for fall and winter forage, than the apple; and, as such, it is strongly recommended to the general farmer. They are as easily housed and preserved from the frost as the root crops, and equally convenient for ordinary feeding."

It would seem that apples enough could be grown on an acre to make the crop profitable; at two rods apart, which I believe to be the common distance, 40 trees will stand on one acre; then, suppose one tree yields 10 bushels, the product will be 400; which, at 25 cents per bushel, is $100.

Apples are said to be worth less for feeding hogs than potatoes; some make the difference one-half, others one fourth. To feed both raw, the difference would be very little. A great benefit to be derived is from the early varieties, which give our hogs a start in the fore part of the season. The peach, and most other kinds of fruit, are cultivated to advantage, except the plum; which, although it seemed heretofore to be in its natural clime, and one of the most vigorous and healthy of our fruit-trees, has of late years been the victim of an insect, (which stings the branches of the trees,) and, in some parts, has been entirely destroyed. No remedy has been discovered. Discreet pruning, in the commencement, might have prevented the evil; it now can only give partial relief. The late frosts, for the last two years, destroyed a large portion of the fruit-crop in this county, and what survived was of an inferior quality.

Manures.—In relation to *manures*, we have not yet advanced beyond the ordinary modes of barn-yard preservation, and it is most economical to have them dishing, or lowest in the centre, that the liquor may not run off. Some believe that to pile it up under the shed during the summer, is a benefit. Whether it is, or, if so, whether the benefit equals the labor, is yet a problem. Lime is used to some extent, and with beneficial results, especially on heavy and clay soils; its tendency is to make them loose and pliable; quantity from 10 to 30 bushels to the acre. Plaster is much used, and is beneficial on most of our land; to all growing crops, about one bushel to the acre; and meadows and pasture land, once a year, with a mixture of ashes; if unleached, one-quarter; if the land is intervale or muck, and has been recently drained and reclaimed from a wet state, and is sour, apply ashes in greater proportion; they aid to neutralize the acid, and, at the same time, furnish the grass with a necessary element of its composition. Price of lime from 12½ to 18 cents a bushel; plaster 15 cents a bushel. Ashes are an incidental production of the farm, and should not be sold or taken off.

Our *farm machinery and implements* are generally good; among the ploughs the most approved are the Springport, Burrall's wheel-plough, and, for breaking up hard ground, the iron beam-plough is much used. Ide's improved is preferred by many as a plough for all work. Ide's wheel cultivator improved is an excellent implement, and especially beneficial when we plough but once. Pitts's improved threshing machine is in general use, and a good article. McCormick's, Hussey's, and Burrel's reaping machines are used. Of the machines for hulling and cleaning clover-seed, the *Rasp* machine of Rittenhouse & Co. is decidedly the best; it cleans faster and with less motive-power than any other.

Underdraining.—We have a machine for making drain-tile—an important aid in the process of underdraining, and in the improvement of our land; the necessity and benefits of which were so ably set forth in a report at our last annual agricultural fair by the committee on that subject, that it is thought an extract would convey useful information. The committee say: "The attention of farmers to the necessity for draining their lands has been called pointedly to the subject within a few years, and the result thus far has been satisfactory and profitable. Scarcely a farm exists but what some part or portion of it will exhibit a constantly moist surface, or a dry surface with a wet subsoil; in either case the saturated soil naturally generates acids injurious to our cultivated plants; and it is well known that when these saturated soils are moved, and exposed to warmth by sunshine, decomposition will take place and the excess of acids discharged, yielding in this condition a good manure.

"The fact that wet soils will not produce well-developed plants is known to every man of common observation; yet it is not well known that wet subsoils do most seriously interfere with our farming products.

"We would earnestly advise the farmers of Seneca county to consider the condition of all their fields more closely, and not be confident in the appearance of a dry surface-soil; for there is many a field which will bear the plough, yet the crop which follows is poor, and the soil is left sour and unproductive. Such fields must generally be kept late in the spring—perhaps too late to work favorably in the autumn. Frost will inflict an injury. In every case, then, where such soils exist, draining is the remedy: the water is carried off; the rays of the sun are permitted to act, communicating warmth; the air penetrates; the roots of our plants are enabled to descend and find their natural and proper food. By the act of draining, therefore, many important benefits are promptly obtained by the farmer; his land is improved, his crops are increased, and his temporal welfare largely promoted."

The average depth of ploughing is supposed to range from 6 to 8 inches subsoil ploughing is done to some extent, and land with a vegetable mould, or muck, as we call it, on the surface, and a hard, clay soil below, containing lime, which is generally the case, is much benefited by that process—if to the depth of a foot, all the better; the best is done by the Michigan subsoil plough; it mixes the substratum with the lighter soil, and gives more strength and firmness to the whole. When subsoiling is done on what we call our lake lands, it should be done by following the surface-soil, ploughing, loosening, and stirring the soil to a greater depth, without bringing any part of it to the surface; on these lands at present, and until the soil is more exhausted, 7 or 8 inches are thought to be deep enough for reversing the furrow-slice. By loosening the soil deeper, it will give better chance for the roots of plants to descend, let the water down from the surface, and be ready for tillage earlier in the spring, and, if necessary to draw fresh soil from below by a deeper furrow, it will be easier done. The yield of wheat per acre, so far as the soil is concerned, without taking into the estimate the injury done by weevil, is on the increase; and the average yield twenty-five years ago, per acre, for the town of Ovid, was thirteen bushels; four years ago, it was twenty-five, and ought to be, and may be, much increased. Wheat, as a general rule, should be sown only on a clover-lay; the system of

stubbling in, so-called, or sowing wheat, after barley, oats, or flax, as it has been and is too frequently done, is a mistaken policy in good husbandry. It costs but little, it is true—once ploughing and two or three times harrowing will do; but generally the crop is light, and often an entire failure; and if by chance it should succeed, it is overtasking the soil, and very likely to prove it so in some future crop; besides, its tendency is to propagate foul weeds generally, and especially pigeon weed, that bane of wheat, and source of vexation to all good farmers. As a general system, instead of stubbling in, these crops should be seeded down; and, if double cropping is done, sow wheat after corn, if the land has been, as it should be, manured previous to putting in that crop.

Not only wheat, but the yield of other crops, is on the increase, which may and should be continued; the soil mostly calcareous, and loam mould of excellent quality, not easily exhausted, only wants discreet husbandry for a general and continued improvement.

The settlement in this county commenced more than sixty years ago, and we have our best yields on land first cultivated, and, with judicious tillage, and the free use of clover—that best of renovating crops—they give promise to be more productive one hundred years hence than they now are.

If the weevil (wheat midge) should continue with us, and destroy or materially injure our wheat crop, the attention of our farmers must of necessity be directed to other branches of agriculture, heretofore comparatively neglected. Whatever it may be, care and diligence will be required to make it profitable; for, although mechanical and chemical science has done much to aid, yet persevering, well directed labor, is the most reliable source of agricultural wealth.

Respectfully, yours,

JAMES DE MOTT.

Hon. THOMAS EWBANK,
Commissioner of Patents.

CANANDAIGUA, ONTARIO CO., N. Y.,
December 24, 1851.

SIR: The following remarks are offered in reply to the Circular of the Patent Office of this year:

Wheat.—The varieties sowed in this vicinity are: Soule's white and red, Soule's white, red chaff bald, white flint, Mediterranean, and blue-stem. The Soule's has for several years past been the most valued, being the most productive. But during the last two years, wheat has been more or less extensively affected by what is usually called the *weevil*, but more correctly known as the *wheat midge*. This is in appearance somewhat like a flax seed, less narrow, however. It is deposited in the house or hull of the kernel, and frequently absorbs the whole kernel. In an examination during the harvest of this year, I found sometimes as many as three of those insects at the foot of one kernel. In such a case the kernel is mainly absorbed, it being reduced to a mere line in size. Heads of wheat having the appearance of holding 60 to 100 kernels, had only from 10 to 40. The wheat crop has this year been reduced in some por-

tions of this county from one-half a crop to less. The wheat crop may be put for the last five years at 20 to 25 bushels per acre. Our county agricultural society have awarded their first and second premiums to crops varying from 40 to 50 bushels per acre. In 1847, first premium crop, $53\frac{7}{60}$ bushels; in 1848, $47\frac{8}{60}$ bushels; in 1845, $59\frac{86}{100}$ bushels.

The Mediterranean wheat is deemed a very hardy grain, less exposed to the *Hessian fly*, and also, it is now thought, less exposed to the *wheat midge*. It has, therefore, been sown more extensively this autumn than heretofore.

Farmers differ very much in the order of crops in rotation. For a few years, corn, barley, wheat, and clover, in the order named, have been tried by some. This is an exhausting series, and the wheat stands a poor chance. Corn, wheat, and clover have been tried. But wheat sown so late in the autumn, (after the corn is cut up and removed,) has this year been greatly injured by the midge. Corn, barley, clover, mowed or pastured one or two years, and then wheat, followed by clover, are now strongly recommended.

Indian Corn.—The varieties cultivated are the small eight-rowed yellow, the large eight-rowed yellow, the twelve-rowed yellow, the eight-rowed white flint, and the twelve-rowed white flint. Some very intelligent farmers in the eastern part of this county cultivate only the white flint, contending that it is two weeks earlier, and also the most productive. This grain is raised in much larger quantities than it was in this county previous to 1847. Good farmers now raise an average of 100 bushels of ears on an acre—often, 120. The county agricultural society have awarded premiums to crops of from 88 to 90 bushels shelled corn an acre. Many farmers select for this crop old meadows or pastures, put on them all their green manure in April, and plough them in the last part of April and the first week in May, harrow thoroughly, mark it three-and-a-half feet apart each way, and plant, from the 5th to the 20th of May, about six kernels in a hill. As soon as up so that the rows can be seen, pass through with a one-horse cultivator, dress the hills with one handful of compost, one-third plaster of Paris, and two-thirds leached ashes. On loamy, clay soils, I would suggest a compost of one equal part of plaster, ashes, and sand. The element wanting in clayey soils for corn is probably *silex;* hence sand, such as is suitable for mortar, may, perhaps, in a compost as above, supply the appropriate nutriment to the plant.* From the time Indian corn comes up till the 5th of July, a cultivator, harrow, or shovel plough, may be run twice between each row as often as the farmer can do it, if once a week. The operation is best and most profitably performed as soon after showers of rain as the soil will allow of working. Average yield of this crop from 40 to 50 bushels of shelled corn to an acre. It has been raised in this county at a cost of six to eight cents per bushel of ears, or eleven to fifteen cents per bushel of shelled corn.

The stalks of corn, if they are cut as soon as the kernels are hard and before a frost, are very good fodder for cattle or sheep. In 1850 I tried the following experiment: on the 15th and 16th of September, when

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[* Sand can do very little, if any, good in a compost. A mixture of three parts of unleached ashes, one of plaster, and one of common salt, is a cheap and valuable fertilizer for corn and potatoes.]

the stalks were green, I had seven acres of corn cut up at the roots, and put in shocks of eight hills each, one hill, round which the seven others were set up, not being cut, and all tied together at the top, the butts being spread out as much as possible. The stooks stood a few days, the weather being very clear. The small stooks were then put three or four together, and firmly bound at the top, and allowed to stand till husked in October. These stalks were almost as bright and green as good hay. They were all cut by a cutting machine, (T. D. Burrall's,) moved by the power of one horse, and fed to cattle. My stock consisted of nineteen head of cattle, viz: four oxen, eight cows and heifers, two yearlings, and five calves. The stalks of seven acres of corn were nearly the support of nineteen head of cattle for three months. The cattle were in good condition. Full four-fifths of the entire stalks were consumed. What were left were daily shovelled from the mangers on to their bedding, and thus used as an absorbent for the manure.

Barley.—The amount of barley raised in western New York is annually increasing. This grain is sown as a crop next after Indian corn, or on sward land newly turned up. The crop varies from 20 to 50 bushels. Premium crops have been as large as 55 bushels. A sandy or gravelly loam is best suited to this grain. Where clay predominates, unless thoroughly underdrained, barley rarely produces more than 25 bushels per acre. Premium crops for five years past from 41½ to 55 bushels per acre.

Oats.—This crop is sown to a greater or less extent by nearly every farmer in this county. Oats are fed almost entirely to horses and sheep. Average crop, say 40 bushels per acre. Largest or premium crops, 70 to 78 bushels per acre.

Peas and Beans.—Peas are sown only in small quantities. This crop is greatly affected by the bug and mildew; and our farmers have generally, of late years, neglected it. Beans are not extensively cultivated, except for domestic use. From 20 to 25 bushels on an acre is reckoned a good crop. Premium crop, 34⅛ bushels.

Grasses.—Clover is sown for pasturage and hay; also timothy. Redtop comes in naturally into moist lands in this region. Two tons of cured hay per acre are a good yield. Leached ashes have been found an excellent top-dressing for lands in grass. One bushel of clover seed is sown on five acres; 10 to 12 quarts of timothy on one acre. For pasture, 15 pounds of clover seed to the acre. Plaster is readily obtained in this county at $1 75 to $2 per ton, or 20 bushels; and a dressing of from 1 to 2 bushels per acre is commonly given to new-sown clover.

Hogs.—For several years the fattening of hogs, except for the farmer's own use, has not been thought a remunerative business. During this year the centre of this county has been connected by a railway, terminating in the Erie railroad, and thereby opening a direct route to New York city. The price of pork is now nearly $6 per cwt. Many farmers raise pigs, and sell them when seven or eight months old. They readily bring on foot from $4 50 to $6 a head, without much feeding on grain. This is considered more profitable than the usual mode of fattening pork.

Breeds.—Berkshire, Leicester, and grass. No experiments are conducted with exactness to determine how much grain of any kind will make a pound of pork.

Sheep and Wool.—The merino, both Spanish and Paula, the South Down, and a few Leicesters, are kept in this county. Of the former, there are choice flocks, yielding fleeces from about 4 pounds to 5 pounds apiece, and readily, this year, selling at 44 cents a pound. The flocks of South Downs have multiplied largely during the 2 or 3 years past. Their wool brings from 30 to 35 cents a pound; but their fleeces do not exceed 3 pounds each, on an average, in any flock in this vicinity. But their carcass is superior in quality and weight. South Downs, at 18 months, dress at 75 to 80 pounds. Our two railroads—one to Albany and Boston, and the other to New York city—have made well-fattened South Downs readily sell here at $5 a head. Some farmers, who have tried the Leicester sheep, deem them too tender for our storms and winters to be profitable. Still, others are trying them, and some are crossing them with the South Downs. The last experiment I consider of doubtful utility. The South Downs are a very hardy sheep; the lambs grow up handsome and fine in form, at 2 months of age, and are then sought for by the butcher as eagerly as the merino or native at 3 months. Yet for wool, the French or large merino are thought to be far the best, yielding a fleece readily bringing about $2 each year.

Roots.—The culture of roots in this county is not extensive. Farmers who come to this country from Scotland and England, after a few years' trial, usually come to the conclusion that Indian corn is raised with less labor, and will make more fat, than the same cost of roots. Carrots are raised by some farmers for milch-cows and horses.

First premium crop of carrots, 1,486 bushels per acre; second premium crop, 1,056; third premium crop, 728.

Potatoes.—Since the disease of this tuber—so world-spread—has prevailed, potatoes have greatly diminished in their average yield. I have raised 300 bushels on an acre; now, 100 bushels is a fair crop. On soils clayey and inclined to moisture, the potato generally rots. On sandy and light loamy soils, the potato is usually sound. For two years past, I have had a sound crop on *new* land. This year I underdrained a few acres of land, a part of which had never been ploughed, though it had been cleared of timber so long that nearly every stump had decayed. The field was planted to Indian corn. On one side two rows of potatoes were planted. Those grown on the land drained and never before ploughed, were of extraordinary size, weighing from one to two and a half pounds each, and still remain sound. They were what are termed here ox-hearts, a round pink-eye variety. So pleased have I been with this experiment, that I have drained about two acres of similar land for a potato crop next year.

In the year 1847, I tried the following experiment: I prepared about sixty rods of land in the following manner: one half was highly manured with horse and cow manure, which had been piled in a heap the autumn before. The other half was treated in this manner: one-third of the drills were plentifully filled with leached ashes; one-third with ashes and lime; and one third with ashes, lime, and manure. The yield was at the rate of 360 bushels to an acre. The potatoes remained sound till about the 20th of September. About half were then dug. There soon followed a warm rain, and hot days, when I discovered that those not dug began to decay. They were immediately dug and placed on a barn floor. Those first dug were placed in a cool cellar. Those in the barn

were soon one mass of putrefaction. Those in the cellar soon began to decay, and not five bushels remained fit for the table. Four varieties were planted: Moshannocs, pink-eyes, peach-bloom, and merinos. In June, 1846, I had purchased a load of merinos, and, a portion of the seed end being cut off previous to cooking, they were found to be a most excellent summer potato. The farmer of whom I bought them, and who raised them in a sandy loam, assured methey had decayed the least of any potato in his vicinity, (town of Victor, Ontario county, New York.) The soil of my lot was a clayey loam, inclined to moisture, the clay predominating.

Fruit.—The cultivation of fruit, especially of apples, is now commanding great attention. The apples of this county, and of western New York, are of excellent quality. Railroads now afford a ready mode of sending apples to market. This autumn, apples have quickly brought, delivered at the railroad depot in Canandaigua, from $1 to $2 per barrel. The amount exported from this county must be very great. It is estimated that from 400,000 to 500,000 bushels are sent from Wayne county. This estimate is founded on Erie canal clearances. This county, it is believed, exports a larger amount.

Quinces are raised also, and many barrels sent both east and west—$1 75 per barrel.

Manures.—Farmers begin to feel that the making, saving, and using of manure is a matter of great importance. Gypsum is found in extensive beds in this county, and is used for clover, corn, and, in light soils, for wheat. Leached ashes are valuable. Lime is used by some farmers. It may be had for 16 to 18 cents a bushel. On stiff clay, lime is thought to have an excellent effect, rendering it loose and friable.

Draining.—No improvement in farming promises more than draining. Where the water is abundant and flows over the surface, open drains, or ditches, should be made. Where the land is soft, moist, or springy, *under-drains* should be dug. These may be filled with stones, if they are to be had on the farm; if not, draining tile may be used. Tile for draining are now manufactured in this county, in West Bloomfield, of good quality, and at reasonable prices. Pipe tile are now esteemed the best. They keep their place better than the horse-shoe form, and the water soon finds its way into them and is freely discharged.

Thorough draining, as practised in England, (see Colman's European Agriculture,) may be too expensive for imitation in this country. Perhaps it is not necessary to any great extent. But there are very few farms which do not embrace a few acres needing some drains. *Swales*, places having small springs, swamps, hollows running some distance between high lands—all need underdrains. Ofen, by uniting these drains, a living stream may be secured, which it, on many farms, an ample remuneration for all the expense of underdraining.

The reader will allow the writer to refer to his own experiments: I have a small farm—140 acres. Most of it is rolling land. Yet every field had land, more or less, on which spring crops, and much more winter crops, would drown out. I have had made 200 rods of open drains, and about 650 of underdrains. I have used 5,000 tile, making 375 rods of the underdrains, and the rest is filled with stone. Allowing each rod to draw the water on each side only 16½ feet, I have drained 1,700 rods of land, or 10⅝ acres. Of these, 5 acres were never before

ploughed, by reason of water. They mainly produced wild grass, blue flags, &c. The expense of draining is as follows: Open drains, 16 cents a rod; under drains, 37½ cents a rod—amounting to about $276. I paid $50 per acre for my farm; five acres redeemed land, at $60, amounts to $300. I have raised the best wheat, barley, corn, and potatoes on the land thus drained, by at least 25 per cent., compared with the average of the whole field. I estimate that, by expending about $75 more, there will not be a square rod on my farm (excepting a wood lot) which cannot be ploughed and made to produce both winter and summer crops.

Besides, I have now three new watering-places during, at least, ten months each year; one of which furnishes a copious supply to two lots of 20 acres each, on which no water was to be found above ground during the whole season of pasturing. And if I wished now to dig a well, to afford water for cattle, I know *where*, as I have marked several places, where there are springs—permanent springs, I have no doubt—by digging ten feet deep.

I regard the saving and increasing of the supply of manure and draining, connected with deep ploughing and thoroughly working of the soil, and a proper rotation of crops, as the sure means of good, successful, and remunerating farming.

Yours, most respectfully,

HENRY HOWE.

THOMAS EWBANK, Esq.,
Commissioner of Patents.

SPRING WATER, WESTHILL,
January 18, 1852.

SIR: Having received the Patent Office Report, and feeling an interest in its general usefulness, I take the liberty to address a few lines to you, although not having been requested to do so; and first permit me to suggest some additional questions to your numerous correspondents:

First.—A description of the soil and timber in each locality, as nigh as may be. Second.—The price of land, means of transportation—whether navigable streams, railroad, or canal—and the distance of the correspondent from the same, and the town he lives in. This will enable those wishing to change their location to form some opinion of the merits of the different sections. Having suggested the above, I will proceed to give some general information.

The surface of the soil in this region is very broken and hilly, affording numerous mill sites, which are generally occupied with saw-mills, grist-mills, furnaces, and all necessary machinery for the convenience of the farmer. The soil on the ridges is what I should call a sandy loam, rather destitute of vegetable matter, but producing clover and other grasses in moderate quantities where plaster is used. The lumber is different kinds of oak, chestnut, and, in places, considerable pine, which is getting mostly used up; and in the low grounds, or feet of the ridges, and along streams, beach, maple, basswood, and some red-oak, which last is generally converted into staves. These are the principal kinds of timber, although others are occasionally found. This part of Livingston

county is rather newly settled and cleared; consequently, any regular system of farming is not generally adopted. Some tolerable crops of winter wheat—I think mostly Soule's—are raised on summer fallow, which is generally ploughed twice, and sometimes three times. Product per acre, from 10 to 25 bushels; average, about 15. Grass yields from 1 to 2½ tons; average, about 1½ ton. Most farmers have a small patch of corn, which, with good care, and what manure can be spared, usually produces a tolerable crop—say 20 bushels per acre. The small yellow corn, that which ripens early, is preferred. Plant from 15th of May to 1st of June; usually ripens the last of September. Oats are generally sown, and do well, on reclaimed swamp-lands, often yielding 40 and 50 bushels to the acre; amount sowed to the acre from 1½ to 3 bushels. The ridge-lands in this vicinity are not calculated to produce good crops of oats unless highly manured. Barley is beginning to excite some attention, and does well on good oat-lands. Each farmer raises all the horned cattle he can keep in tolerable condition, which can only be made to pay for their cost by consuming the straw and coarse products of the farm. Hay is usually worth about $6, but sometimes sells as high as $10 per ton. Three-year-old steers sell from $20 to $30 each, according to quality. Cows, in the fall, to keep over winter, are worth from $12 to $15; and in the spring, with a calf, from $18 to $25. Cattle in this vicinity are of various pedigree—few that can be traced to superior stock. Horses are very high, ranging from $75 to $125. Sheep I consider the most profitable stock, leaving out horses, that farmers in this vicinity can raise. In the first place, I consider them the best stock to improve land that farmers keep. The Paula merino I think the most approved breed for our latitude. They are hardy, yield a heavy fleece, and, with proper care, will raise good thrifty lambs; and, with wool at 40 cents per pound, it will pay all expenses and interest on the money invested, leaving the lambs clear profit. Flocks in this vicinity average about 3½ pounds to the head; some yield considerably higher. A flock of ewes well cared for will raise ninety lambs to one hundred ewes. Potatoes have, in many places, proved a total failure; while some have succeeded in raising a tolerably good crop. The pale reds—some call them Sardinia reds, others Lake Erie reds—I consider least liable to rot; while pink-eyes and flesh-colored, or peach-blow, are pretty sure to rot. It is of little use for me to speculate upon the probable cause of the rot. So far as my observation extends, plant upon dry, sandy soil without manure, which will produce medium-sized potatoes, less liable to rot than those having rapid growth. The much-mooted question about seed-potatoes is about as difficult to settle as the cause of the rot. I have raised good potatoes from large and small potatoes, and even from potato-peelings. I think there is more in the ground, season, and manner they are tended, than in the size of the seed. If I planted large potatoes, I should cut them and scatter them about in the hill. Our market is mostly at Dansville, eight miles distant, although we have several mills nearer, which buy more or less grain. The Buffalo and Cohocton Valley railroad runs over the highlands in this vicinity; it is now being built, and, when finished, will give us a direct market to New York city.

Under the head of fruit, I would say that not much at present is raised, although some interest is felt in this branch. I have had con-

siderable trouble with the apple borer—a grub about an inch long, white body and black head. I know of no way of exterminating them but to open the bark where you see they are working, with the point of your knife, and cut them out. Month hands get from $12 to $15 per month for six months on a farm; day-laborers get, for haying, $1, and for harvesting, from 10 to 12 shillings per day. Land sells—just about where I live, or rather, I should say, the owners ask—for from $20 to $40 per acre, according to situation, buildings, &c. I do not know that I ought to trouble you further.

Yours, respectfully,

C. GARDNER.

Hon. THOMAS EWBANK,
Commissioner of Patents.

PRATTSBURG, STEUBEN CO., NEW YORK.

SIR: Your Circular of August, 1851, is received. The inquiries embrace many topics of interest, and are calculated to elicit much valuable information.

In this county the clearing up of lands, and lumbering, have heretofore trenched greatly upon the tillage of the soil; and the culture of cereal crops was greatly neglected. But, as the timber disappears, agricultural pursuits receive increased attention; and, for the last ten years, wheat, oats, and barley have been successfully cultivated.

Wheat.—In the culture of wheat, guano is not used in this vicinity; nor, indeed, are any fertilizers applied to the crop, except gypsum and lime. Our lands are mostly new, and, as yet, unexhausted. With proper tillage, they may, for a series of years, yield fair crops.

Our farmers do not study the difference in soil, or any of its defects, for the production of crops. This will occupy their attention after the soil has been exhausted of its original fertility by improvident culture. Not until then will the science of soils and manures open a resource for successful tillage and improved crops.

The ploughing in this vicinity is generally hastily and carelessly performed. And the average yield of wheat is, consequently, not more than from 10 to 16 bushels per acre. I prepared a lot, that had not been much tilled for years, by ploughing it 12 inches deep, and crossing it twice; upon which I sowed, the last week in August, two and three fourths bushels of Soule's wheat per acre. The seed was rolled in plaster when sowed. It ripened, and was cut the third week in July, and produced 34 bushels per acre. A small lot of white flint wheat rather exceeded that in its yield. The time for sowing wheat is from the 25th of August to the 10th of September. In clay soils it should be sown in August; in warmer soil in September. The agriculturist should study the temperature of his soil and location, and sow his grain earlier or later, as the premises may warrant. The price for wheat has been from 75 to 85 cents.

Oats.—The crop of oats has been unusually productive in this vicinity. Yield, from 35 to 55 bushels per acre. From 10 acres I have harvested 538 bushels; price 25 cents.

The culture of *fruit* is receiving increased attention. Many old orchards are being improved by grafting, and others are produced by planting improved varieties of fruit. In this particular section of the county, we have in bearing every leading variety of the apple suited to our climate. Several new and valuable varieties have been added to the list; among them are the northern spy, the Hawley, the early Joe, the waggoner, the Belmont, or gate. The best varieties for winter use and for exportation, are the greening, the russet, the waggoner, and the northern spy. I have known the russet to keep until October. With proper culture, the apple may be made as profitable as any other product of the farm.

The peach is scarcely cultivated in this town, because it was taken for granted that it could not be produced in perfection. Some two or three of our citizens, by a liberal and careful culture, have succeeded in raising fine and abundant crops, and others are gradually imitating their example. By the application of charcoal and ashes to the roots of the peach tree, and by keeping the ground well tilled, luscious fruit may be raised for a succession of years. But no one ought to expect to raise the peach, nor indeed any other fruit, unless he keeps the soil enriched and thoroughly cultivated.

The idea of a stiff sod and a hard substratum is as consonant with the raising of fruit as with the production of a cereal or root crop.

Forest Culture.—Of the culture of other than fruit trees, all that is practised, as yet, is to cut down and destroy. This is incident to all new countries. Not until a total waste of foliage is produced does the culture of trees receive even an incidental attention. At first, a single tree is planted before the cottage door, *for shade*, and then, perhaps, another, for *uniformity*. Beyond this but a few extend their culture of trees, or even dream of their utility.

This is a subject well worth the study and attention of our citizens; it is so strictly connected with the pleasures of home as to comprise an important source of domestic happiness. Trees, in all their varieties and stages of growth, are as important to our home, to render it pleasant and agreeable, as any other fixture. The shaded and ornamented grounds speak as eloquently of pleasure as does the cheerful fireside or the laughing countenance of its inmates.

The attention of some of our citizens have lately been directed to this subject, and they have entered upon its practice. We have noticed its inception in the ornamented shrubbery and trees around some dwellings—a few at first, and planted without much taste or design. But this constitutes the beginning, and will induce repetition. A gradual awakened and cultivated taste will result.

From the dwelling to the lawn, and the highway, groups will appear, from year to year, until the culture of trees shall be deemed as important as any other branch of labor.

As this subject is intimately connected with rural taste and rural enjoyment, it is destined to be cultivated, for the time, by those of our citizens only in whom education and associations have awakened refined feelings, and a sense of the beautiful. So long as it remains a *mere amateur*

occupation, it will be confined to this class; but as our country becomes older, it will become profitable, and then the planting and culture of trees will receive general attention, and the subject be ranked among the useful employments of our citizens.

We feel the want of an agricultural school in our State, in which the sciences intimately connected with farming and rural occupations may be taught. As it is, we merely glean the periodicals of the day, and attain such information as enlightened and educated agriculturists around us can impart.

Respectfully, yours,

G. DENNISTON.

To the COMMISSIONER OF PATENTS.

BIG FLATTS, CHEMUNG COUNTY, N. Y.,
September 24, 1851.

SIR: I received a Circular from you, requesting such information as I might be in possession of in relation to the agricultural interests of this county. With this I will cheerfully comply, believing that the information gathered by such means as you have adopted will be of vast advantage to the agricultural interests of the United States. Although I may be able to contribute but very little to the great object, I will give you the results of my experience in the cultivation of the soil. In the first place, the land I cultivate is an alluvial soil, or a sandy loam, of a very good formation for all the agricultural purposes incident to the climate.

Wheat.—My best success has been in a rotation of crops, in the following manner: First, the land should be seeded with clover of the middling quality. This, after pasturing one year, (the clover shoud be well sowed with plaster,) should be turned under with three horses, so as to plough it about ten inches deep; then plant with corn; next sow with barley; finally plough the barley stubble, and sow with wheat, which yields, on an average, about 30 bushels per acre—in some instances as high as 40 bushels per acre. I consider this the best system.

On my soil, (stiff clay,) the fallow system would be better, in order to pulverize the soil.

As to *corn*, proceed as stated before, until planting; I then plant the berry, yellow, in drills three feet apart; I then drop plaster and ashes, equally mixed, in the proportion of about 2 bushels to the acre, which makes a small handful in each hill; then drop the corn on the ashes and mixture, and cover the same with about 2 inches of earth; then plough well, hoe twice, and plaster again, when up, with plaster alone. With this process I have prevented the worms, and have increased the product 30 per cent. The best method to feed corn, undoubtedly, is to grind and cook it. Animals are then able to extract all the nutritious matter from it. Corn stubble makes the best preparation for lands designed for oats. I have raised 80 bushels to the acre; but oats impoverish the lands too much; consequently I do not raise them to any extent.

Barley.—I sow this on my corn stubble; get a good crop without injuring my land, and still prepare it better for wheat. Yield per acre, 40 bushels.

Average price of the above crops here in the market—wheat, $1; oats, 31 cents; barley, 63 cents; corn, 1 cent per pound.

As to *dairy*, I keep just cows enough to make the rotation of crops and to eat my clover. The information that I could give on this point would be of no importance.

Tobacco is now cultivated here to some extent, and bids fair to be extensively raised, as it grows well, and will, no doubt, pay well when the people become acquainted with its culture.

As to *potatoes*, the best place I have found to raise them is on sandy soil, in order to prevent them from rotting, as this is the chief thing we have to contend with in their culture. The theory about insects and mildew, in causing them to rot, is but the result of a brilliant imagination; as I have seen two varieties planted in one hill, where one would be entirely rotten and the other wholly sound. The most successful method I have practised is to plant them just as I do corn, using the same kind of manure, and in the same way.

I think I can speak of the system of farming I have laid down with some confidence, from the fact that the farm which I cultivate was, ten years ago, considered worn out; but by deep ploughing, and a rotation of crops, the product has increased from 5 to 20 per cent. per year, and still continues to increase, but not to so great an extent. In the mean time I have husbanded all the manure that would accumulate from such a system. I have purchased no fertilizers but ashes and plaster. Lime would, no doubt, be of vast importance; but the cost here is too much to make it profitable—70 miles being the nearest place it can be procured. Guano has never been employed here; consequently, I cannot inform you whether it would be profitable or not.

Yours, respectfully,

JOHN HAGGERTY.

FALLSBURGH, SULLIVAN COUNTY, NEW YORK,
December 30, 1851.

SIR: Your Circular, calling for agricultural statistics for the current year, was duly received, and would have been answered sooner had it not been for a delay in order that I might furnish you with a meteorological table, kept at the Liberty Normal Institute, which I could not get until the end of the year.

I remark that in replying to your questions I shall mention such articles as I am familiar with, and those based principally on experience.

Oats and Rye.—Oats are extensively raised in this county; average yield would not vary much from 30 to 35 bushels per acre. This crop has deteriorated very much of late years. The true cause is, I think, that the land has been exhausted of some of the necessary elements for producing this kind of grain. I use 3 bushels per acre for seed. Some farmers only use $2\frac{1}{2}$. The best acre of oats that was exhibited at our county fair, to which was awarded the first premium, was 66 bushels. The average yield of rye is from 10 to 12 bushels per acre. From 28 to

41 bushels have been on exhibition at our county fairs. From $1\frac{1}{4}$ to $1\frac{1}{2}$ bushel of seed used. I prefer the latter quantity. I consider rye the least exhausting of any grain we raise, and the oats the worst.

Neat Cattle.—I have never kept an account of the cost of rearing. Heifers in calf at 3 years old are usually worth from $18 to $22. Good dairy cows in the spring sell for $25 to $30. There is very little difference in the prices in spring or fall. Since the Erie railroad has been in operation, new milch cows are eagerly sought after, at all seasons in the year, by men who furnish the New York market by that road.

"*How do you break Steers to the yoke?*"—Our usual custom is to put them in a yard that is clear, and yoke them together; never tie their tails together, as was an old custom, to prevent their turning the yoke. Put a halter on the near-side one to prevent their running away, and, with the halter in one hand, and a whip in the other, commence driving them gently, seldom using the whip. If they are stubborn, urge them gently. Harshness only makes them worse. If they are disposed to run, let them have their way. The yard will prevent them from getting away from you. After worrying awhile, let them run a little while alone, for an hour or two, occasionally giving them a drive. They should not be driven to make them tired or leg-weary. This is the cause of some oxen lying down when they get a little weary. When they get a little used to driving, they should be fastened to something light, to learn to draw. A pole or a sapling is very good. After a drive of a few hours every day, they will generally get gentle enough to partially dispense with the halter. It should wholly be dispensed with as soon as possible. After they get a little used to drawing, they should be put to a cart or wagon and taught to back. It is a very good plan to commence backing where the ground is a little descending at first. Oxen, if properly managed at first, can be taught to back nearly as much as they can draw, which is often important. After they get so far broken that they will draw light loads, they should be driven a short distance and stopped, and be learned to hold up their heads. This is generally easily done. At first it will be necessary to lift up the yoke on the near steer by hand; and putting the right knee under the bow, and a little motion of the foot under the off-side one's chops, will bring his head up. A little practice in this way and a motion of the whip will make them raise their heads at the word when they stop. This always makes oxen show to good advantage. When I have a well-broken pair of oxen, that for size will match tolerably well with steers, I mismatch them together. In this manner they get broken much sooner. Oxen and steers should never be hallooed at as if they were deaf, much less whipped, only in case of necessity. Patience and kindness should be freely exercised in breaking steers. A good whip with a light slim lash is best, and, when it is necessary to use it, let it be a snap rather than a stroke with the whole lash. An ox should never be used to expect a blow before he starts, but learned to start at the word, and, if they are not overloaded and mauled to make them draw, instead of their becoming drones, they will be spry and active, and will perform with nearly as much activity as the horse.

Horses and Mules.—With mules I have no experience; with the horse I have. I consider raising horses of good stock and character a profitable business to the farmer, but those of inferior character a dead loss. Horses of an inferior character always sell at low prices, and it is gen-

erally to such men as are hard to get pay from; while those of a superior class sell readily to men who are able to pay down.

I have never kept any account of rearing until three years old. One thing I am certain of—it costs but little more to raise a colt than a heifer or steer. As respects the keeping a brood mare, I can hardly determine. I have raised some excellent colts, and worked the mare the year round; others I have reared, and scarcely worked at all; and I have never been able to discover that the colt was any better at the age of three years. Great caution is necessary, in working a brood mare, not to overheat or overwork her. When a mare runs without work, she gives a larger flood of milk, and the foal depends on it. The reverse is the case with a mare that works. The foal soon learns to depend on its own feeding; and when weaned, will seldom pine away, like a colt that has always had a full supply of milk. I have generally found it easier to keep a colt in thriving condition the first winter when the mare has been worked than when she has run idle. This I account for from the fact that the colt has sooner learned to depend on its own resources. As respects the profit of keeping a brood mare at work, or one that does not, I consider the balance much in favor of the former. It is very expensive keeping horses, unless they are kept at work.

"*What is the best way to break Horses?*"—I consider this an important question, and as much overlooked, perhaps, as anything relating to rearing and fitting horses for service. A well-broken horse is what every man wishes for, and will command a readier sale, although he may be somewhat inferior in other respects. Such a horse only can be depended on. When I speak of a well-broken horse, I wish to be understood one for farmers' use; and such a horse, I believe, will answer all purposes that a horse is used for. I shall only speak of breaking to harness. I will simply say that my opinion is, a colt should not be used under the saddle until it is at least four years old. I think breaking to harness should commence at three years, but never put to hard work till six years old. In order to break a colt as he should be, it is of great importance to have a horse that is qualified to break him with; and, in order to make myself understood, it will be necessary to describe some of his qualifications. In the first place, he should be, in every way, perfectly true and kind. A horse that will bite a colt is unfit for the purpose. He should be a good stepper, because this is indispensable to a good traveller. The step is what tells in the journey. There is many a horse that can trot fast, and is at the same time a poor traveller. When a good stepper is found, it almost invariably follows that his other gaits are in proportion. He should also be well broken to the word. Now, I would put the colt in the stable, and put the harness gently on him, keeping the doors all shut, and let him stand in the stable a few hours in each day for a few days until he gets used to the harness, and occasionally lead him out doors to get him accustomed to it. After he gets over showing fear of the harness, he should be placed beside the horse he is to be driven with, and the two harnessed together. Great care should be used not to frighten him. After getting all ready, a person should take him by the head, and another hold off the lines with a whip, and begin to lead him along. If he is disposed to run, hold him in gently; never jerk him in the mouth; humor him in the bit until he gets use to it. After driving him around an hour or two, if he is not

afraid, you may attach him to a wagon that is not too heavy, and drive him on a walk, if possible; but, if he is disposed to trot, bring him to the walk as soon as you can, and drive him on the gait, and, if possible, never let him break the walk till he is learned to walk as fast as he possibly can. Much may be done, in the breaking of a colt, to increase his speed for a traveller. Driving him on a walk will not worry him; consequently, he can be kept longer in the harness than if he was driven fast. As soon as he appears to get a little tired, unharness him carefully; see that every part of the harness is unloosed before you attempt to take it off. His breast should be washed with cold water. The next day he should be harnessed and driven as before, unless his breast shows symptoms of being galled, which will be discovered by the hairs being wet under the collar. He should never be harnessed when there is the least appearance of his breast being sore. Great care should be used in turning about, for fear the wagon-tongue may strike him suddenly, and cause him to kick. After he has been driven day after day till he has become accustomed to the harness and carriage, and learned to walk as fast as it is possible for him to do, you may commence the trot, in which he should be as thoroughly learned as to walk. It will not do to drive him far at a time; but drive him a little way, and stop till he gets rested. It is as necessary to teach him to stop and to start as anything else. After he gets thoroughly broken to the trot you may let him walk or trot occasionally; but be sure not to let him get both gaits mixed up together, which will spoil both. Make him understand his business thoroughly, whatever it may be. You may now commence drawing light loads with him, but be sure not to put a heavier load behind him than the break-horse can easily draw, and get your carriage in a position that will start easily. Be sure to have your break-horse ready to start when the word is given. In this way he should be trained till he thoroughly understands his business. Always bear in mind that the gaits above described are of the utmost importance to the value of the horse; and whether driven to a load or light, close attention should be paid to his gaits till they are thoroughly understood by him. Now, another kind of training will be necessary for the farm. That requires another kind of gait. I have always found that the best kind of work to put a colt to at first was to put him to harrowing ploughed ground. This is work that will soon make him leg-weary a little, and it will be easy to bring the quick step to a slow one, which is always necessary for ploughing; and whether for ploughing, or dragging, or whatever the work may be that requires the horse to go slow, he may be trained to this gait without injuring his step before the carriage. But let him thoroughly understand what his business is, and in after-life he will never forget it, and it will add to his value as long as he is able to work. In driving on a walk the lines may be a little slack; but he should always be taught, when the line is drawn tight, to start off free; and, when the line slackens, to come to a walk. Great pains should be taken to learn him the word to stop or to start. "*Whoa*" should never be said to him unless it is intended for him to stop. Those who are unaccustomed to thorough breaking may say I am taking a great deal of unnecessary pains; with such I will have no controversy. I will only say to them, try your kind of breaking, or rather no break or gait at all, with a thoroughly-broken horse on the road, and satisfy yourselves. I am confident that whoever will follow my

mode of breaking will feel themselves well paid for their trouble. I am well satisfied that there are many that would have been valuable horses; but, for the want of thorough and proper training, they have become nearly worthless. There are some persons who have not a suitable horse to break a colt with. When this is the case, it would be better for the owner to put his colt into the hands of some man who has the proper means to do it. I have broken a number of colts, and never had one that proved unkind in my own hands. Some of them were very high-mettled animals. With such much care is necessary in training. Such horses are generally much more to be depended upon when they are broken.

Two years ago I received a small package of rye-grass seed from the Patent Office that bids fair to be valuable in this section of country. It starts earlier in the spring than any other grass I am acquainted with, and I think will produce two crops in a season. The seed ripened here by the 8th of July.

I have harvested the second crop of multicole rye from the small package I received from the Patent Office. It appears to be of an excellent quality, and I think will prove productive.

Root Crops.—Since the failure of the potato crop, the rutabaga and flat field turnip have been extensively raised, and I think are rather on the increase. Carrots and beets are only raised for culinary use.

Irish Potatoes.—Since the potato disease first made its appearance, the average yield per acre has fallen short of what it formerly was, with most varieties. Many of those that were formerly considered the best for culinary purposes have entirely disappeared, while a very few varieties have continued. Among those that have been the least affected by the disease, the yam potato stands first; and I do not know that I can do any better than to refer you to the Transactions of the New York State Agricultural Society for 1849, page 571. In addition to that, I can say that I have raised, ever since, excellent crops, without the least symptom of rot. In each year since, I have raised several other varieties, most of which have rotted more or less. Some have rotted the last summer. I have, in the last three years, shipped several hundred bushels of this variety to different ports, and in some six or seven States; and, so far as I have heard from them, they have been entirely free of rot. They are very firm and crisp, and require the whole season, in this section, to mature.

We have a wire-tooth horse-rake in this section that answers an excellent purpose in our stony country. It has, I believe, nearly done away with the revolver, and is a great labor-saving machine. Its superiority over the revolver is that it works nearly as well on the stony ground, where the stones are not too large, as anywhere. It is simple in its construction, and is easily repaired. The price is about $8 or $9.

Annexed is a *meteorological table*, that was kept at the Liberty Normal Institute, in our county, which was kindly furnished me by the proprietor, John D. Watkins, M. D.:

1851.	Mean temperature.	Water fell.
January	25° 4′	2.47 inches.
February	28 0	7.69 "
March	33 6	3.15 "
April	41 0	10.91 "
May	54 18	3.69 "
June	60 0	4.88 "
July	66 0	2.68 "
August	64 3	2.22 "
September	38 0	3.49 "
October	48 0	2.68 "
November	31 7	3.64 "
December	20 3	3.88 "
		51.38 "

I remain, most respectfully, your obedient servant,

LOTAN SMITH

NEW JERSEY.

HACKENSACK, BERGEN COUNTY, N. J.,
December 16, 1851.

SIR: Our postmaster, Mr. Peter V. B. Demarest, having resigned the office held by him, requested me to answer the Circular issued from your office in August last. Our location is about 12 miles from the city o. New York; and being thus near the market, we are about as much gardeners as farmers.

In regard to *wheat*, with us it is chiefly raised for home consumption; and barn-yard manure is ordinarily used; the product averages about 20 bushels to the acre; it is sown about the 1st of October, and harvested about from the 5th to the 15th of July. We soak the seed in pickle, and then mix with dry ashes or plaster, and use about 1½ bushel per acre. The yield is increasing. My neighbor sold 150 bushels of this year's crop for $1 15 per bushel.

Corn produces about 50 bushels per acre; cost about $15. My plan is, to plough up old mowing ground, 9 inches deep, as soon as the frost is out, and plant about the 10th of May; then apply about one gill of unleached wood-ashes per hill before the corn is up; hoe twice, and plough between as much oftener as I can until the corn is about 2½ feet high. I cultivate the southern horse-tooth and the northern white-flint (no mixture) in preference. I feed the southern corn whole to horses and swine, as it is easier to masticate, being softer, and have the flint corn invariably ground for feeding, except for poultry. I have never sold the flint corn for less than 75 cents per bushel, and meal $1 50 per hundred weight. I do not sell until about November, when, in our section, it is scarce. Of oats we use about 2 bushels seed, and the yield is about 35 bushels per acre; of rye, about 1 bushel of seed, and the yield is about 18 bushels per acre. Clover yields about 1½ ton, and timothy, or herds-grass, 2 tons per acre. Mowing-grounds are not manured, as they are not generally cut for more than four years, when the ground is

again ploughed for corn. The cost of producing hay is about $5 per ton, and it is now worth, by the load, loose, $17 per ton in the New York market.

Neat cattle, at 3 years old, are worth $18; good cows, in the spring, are worth $35; in the fall, $25.

Tobacco is beginning to be experimented with. I have tried what with us is called seed-leaf, which is valuable for cigars and wrappers. It has been quoted in the New York market, through this year, at from 16 to 20 cents per pound. Our good average crop is from ten to fifteen hundred weight per acre; but upwards of a ton has been raised from an acre. The cost of producing is about $4 per hundred weight.

Turnips are on the increase. They are generally sown broadcast, and are of the Aberdeen variety. The yield is from 400 to 500 bushels per acre. There is no after-tillage; and I find them as valuable as beets for cattle, with less than half the cost of production.

Potatoes (Irish) will not yield one-half as much when cultivated in the usual way as they did but a few years ago. I use lime liberally on the land, and think it is a preventative against the rot. I this year more than doubled my product by using the following: For a small lot of 2½ acres, I carted out and put in a heap 30 loads of barn-yard manure. I took 10 gallons of sulphuric acid, diluted with 30 gallons of water, in which I dissolved two-thirds of a barrel of ground bones; then diluted the mixture with 2 hogsheads of barn-yard liquor, and put it evenly over the heap of 30 loads of manure; mixed it well by turning over for two days. I then carted and spread it out, and ploughed in while wet. Where I used double the quantity of barn-yard manure, I had not half as many, or half as large potatoes; consequently, I shall be induced to try it again.

Manures.—We use no guano. We have abundance of salt-meadow hay, from which we make manure; we use lime liberally; plaster, sparingly; ashes, as much as we can get from New York and elsewhere. Swamp muck is getting in repute as a fertilizer. It is carted on heaps, and mixed with one-tenth its bulk of lime, or one-fifteenth of ashes, and generally lies 6 months before using. I have found the muck mixture equal to barn-yard manure for corn, potatoes, grass lands, or the cereal grains, and at less than half the cost; and as the supply generally is abundant, there is no limit to the amount we may make. I will only say that our section, in regard to farming, is vastly improving. Agricultural associations have been formed, which give a perceptible impulse and create competition among the members by the various experiments made and facts deduced. I think we produce full one-third more on the same land than we did ten years ago.

With great respect, sir, I remain, obediently, yours, &c.,

DAVID R. DOREMUS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

POST OFFICE, WOODBURY, GLOUCESTER COUNTY, N. J.,
October 28, 1851.

SIR: Not being a farmer myself, I handed your Circular to one of our best practical farmers; and his remarks upon the same I herewith send.

you. The articles of sugar-cane, rice, tobacco, and hemp are not, that I know of, cultivated in this county; consequently, I can say nothing about them. Hoping the information I send you may be of service, I am, with great respect, your obedient servant,

ALEXANDER WENTZ.

Hon. THOMAS EWBANK.

Wheat.—In this county guano is but little used in the production of wheat, and has proved uncertain in its operation where it has been tried; average product per acre, about 15 bushels; best time for seeding, 1st of 10th month, (October;) harvesting from 1st to 10th of 7th month, (July;) 1½ bushel sown per acre. Plough twice—the first 6, the last 3 inches deep. The average per acre may be increasing, owing to the improvement of the land; but the quantity grown must decrease, because there are many crops better than wheat, at $1 per bushel, that can be grown.

The rotation is corn, potatoes or some kind of truck; wheat, sown with timothy and clover grass-seeds, to remain from 3 to 5 years.

Corn.—Guano is not much used with corn, which is the most profitable of all the grain crops, producing from 30 to 50 bushels without manure. The best culture is with the cultivator and plough—one of which should be used every fortnight from the time the corn is large enough until it shoots in tassel.

Clover and Timothy are the favorite grasses for upland, and yield about 1½ ton per acre. Marl or green sand is much used for the production of grasses, and is, with lime and plaster, the best of fertilizers.

Neat Cattle.—Raising cattle to 3 years old costs about $20, which is about the selling price. Good dairy cows are worth from $25 to $30. More meat is made in a Durham than native animal by the same food.

Horses and Mules cannot be raised to much profit, as it costs from $60 to $70 to rear them to 3 years old, which is about the average value. To handle them while young, and use gentle means, is the best system of breaking.

Wool-growing is not profitable, but raising lambs for the butcher is; when from 3 to 4 months old, they bring, in Philadelphia, from $2 50 to $3 per head. Large, open-wool ewes are preferred, and will average 1¼ pound each. The most productive system is to pass the whole flock (except the bucks) into the hands of the butcher during spring and summer, and renew in early autumn.

Hogs.—A cross with the Berkshire makes a good breed of hogs. Let the pigs come as late as will allow their mother to get fat by New Year. Keep them well during winter, and turn them on clover in the spring, when they will grow and do well without other feed until fall, when some offal, potatoes, &c., will prepare them for the pen, where from 5 to 8 bushels of corn will make them weigh 200 pounds, which is as heavy as desirable for the selling of hams and shoulders. One of the best receipts for curing is, for 80 pounds meat, 1 pint fine salt, 4 ounces brown sugar, 3 ounces saltpetre, pulverized and well mixed together; rub the meat all over with it, laying them singly on a board; let them remain 24 or 36 hours; then pack them down in a tub, and add 2 quarts of fine salt for every 80 pounds; let them lie 15 days, and then hang them up for smoking.

Turnips.—The cultivation of turnips is rather on the increase. It is found to be a good plan to plant them directly after digging early Irish potatoes, without any other than the manure put on the potatoes. To use a drill is the quickest way to plant them. Thin and hoe them as soon as possible, when they may be cultivated with a cultivator. Average crop from 300 to 500 bushels per acre.

Irish Potatoes are planted much with marl, without any manure; the yield is about 100 bushels per acre. The crop may be increased by mixing manure with the marl; the mercer variety most in favor.

Sweet Potatoes.—Cultivated in hills 3 feet apart each way; a small shovelful of manure, well rotted, put into each hill, which has but one plant put in it, previously sprouted in hot beds; should be ploughed and hoed about 3 times; yield about 125 bushels per acre; worth from 50 to 100 cents per bushel.

Fruit is not receiving the increasing attention it demands; for an acre of well selected apples, or other fruit, suitable for the market, would yield more profit, if properly taken care of, than if cultivated with grain. For the feeding of hogs and other animals they would not compete with grain or vegetables. The Roman stem and wine-sop apples are, of late, among our best for keeping.

The best plan to preserve manure from waste, is to apply it to the land soon after made; and the best way to make it, is to collect all the vegetable matter possible, and put it in the barn yard and pig pens, &c.; also, when the manure is left in the yard all summer, it is good to cover it with soil, muck, and plaster. Lime is much used—from 30 to 50 bushels per acre. Plaster is also used on clover and on Irish potatoes—about 1 bushel per acre.

PENNSYLVANIA.

WARREN, WARREN COUNTY, PA.,
October 3, 1851.

SIR: In reply to your Circular, I have to say that the circulation of your Report, however valuable and useful for the agricultural interests, rarely finds its way to the practical farmer. But the political bar-room politician and professional man are generally the only recipients of such favors, and, unless you can adopt some different mode, it will be rendered unprofitable to the cause of husbandry. Would it not be within the scope of your duty and office to circulate it more fully through agricultural societies, who would readily furnish their lists of officers, and be furnished through their secretaries? I have never had a copy but once or twice sent me, and that happened through a friend, then a member of Congress. But, as the fates have it, we never had him returned, nor any one of his stripe, from this district. Now for the grain:

Wheat is not very extensively cultivated in this county—winter growing only on the rivers, flats, and bottoms, or on some oak and chestnut ridges; the main reliance being on spring wheat. Guano is not used in this county as a manure for this or any other crop. The average crop of spring wheat of the Black Sea variety may be 20 bushels per acre; but of the other varieties, not to exceed 15 per acre. Fall or winter, 25

bushels. For the latter, summer fallowing, as a preparation, is still resorted to. But late fall wheat is raised frequently from corn-fields and potato-ground by one ploughing, if the soil is adapted; if not, the following spring. Spring wheat, ploughed late in the fall, and sowed as soon in the spring as the ground will admit, gives the best returns. Good crops have been raised of fall wheat from meadow land, broken up after the crop of hay has been removed, ploughing only once; common depth of ploughing, from 4 to 5 inches. I think, of late, a better system of farming has been practised in raising wheat; and I think it is on the increase now. In this, of course, I do not mean to take into account the primitive crop raised on virgin soils newly cleared. Very little system as to rotation of crops prevails. Wheat after corn, and other hoed crops, being manured, seeded down to grass; broken up again, sowed to oats, next rye, and then to buckwheat; then corn, and with all the manure. But many get good returns, and practise planting corn on green sward, ploughing immediately before planting. Rust is the greatest disadvantage we labor under here. The county being greatly engaged in lumbering, we have a market at home for all descriptions of grain; wheat usually commands $1 per bushel. The average of this is probably 50 bushels per acre—costs, per bushel, 25 cents.

Corn.—I think that corn is the only crop that will stand the effects of barn-yard manures, as they are applied in the spring, as they ought to be, to get the full benefit of all their qualities. You ask to "State if you can how much grain the manure from ten bushels of corn consumed by hogs will add to an acre, if carefully saved and skillfully applied, at or before time of planting." In reply to this, I would say, that I have never seen it carefully saved nor skilfully applied; but if skilfully saved, by adding to the sty a full supply of straw and other materials, which hogs would incorporate into manure by their excrements, it would add one-fourth to its value.

Oats, average yield 40 bushels; *barley*, 25 bushels; *peas*, 20 bushels; *beans*, 40 to 50 bushels per acre. Least exhausting are rye and peas. Peas are not cultivated as renovating, but buckwheat and clover.

Clover and Grasses.—From 1 to 1½ ton may be said to be the average yield. The best fertilizer is gypsum, excepting on naturally wet meadow, where it has but trifling effect. Timothy seed is generally preferred; but on the flats and gravelly soils, mixed with clover—mostly the small kind of clover; but the large clover I prefer, as it accords more with timothy in maturing. Four quarts of good clean seed are sufficient, particularly if prepared by an application of gypsum.

Dairy.—130 pounds of butter, on an average, and 350 pounds of cheese, from a cow; comparative cost—say 6¼ cents per pound of butter, including all expenses; 4 cents per pound of cheese. Average price of butter is one shilling, cheese 6d.

Neat Cattle.—Cost of rearing till 3 years old, $18; price at that age, $25 to $27. Value of good dairy cows, in spring, is from $25 to $30, and in fall $20. The Durham half-breeds seem to feed easier than the purely native, and yield more according to the food consumed. Begin young with calves to accustom them to a light yoke, and they seem no more to forget it; and it makes a very pleasant pastime for the boys. This is the best mode with all animals—frequent kindly handling.

Horses.—In rearing good horses there is some profit, and a certainty, too. I think it costs $60 to rear a colt till it is 3 years old. Taking into consideration the keeping of a mare purely for breeding, this is a low estimate. In ordinary cases—say $45 to $50, using the dam at the same time. Breed mares and colts should have free open air in winter, but a good shelter, when they wish it, at their control; good clean bedding there; a supply of water also at their hand, and plenty of hay, and some small supply of grain; ground or boiled oats are best. In summer, plenty of grass and good water, with a shelter to run to from sun and rain, and the pitiless storms of the spring and fall. This last is within the reach of all. Get some slabs to make a shed—can't you?

To raise superior animals, I have found it best to breed every alternate year, giving the colts a full chance with their mothers till the early grass of the second spring; then weaning them. Of late, I prefer handling early colts; as there is nothing, in my opinion, to be gained, as was supposed, by leaving them till more mature in their spirits and carriage. That springs from other sources, and cannot be so easily accomplished by art.

Wool growing is profitable; price, the present season, from 35 to 45 cents per pound. The large sheep for mutton; small for wool. I think there is no material difference in the cost of producing fine or coarse wool. What is lost in carcass is gained in wool, and *vice versa*. The coarse are more prolific than the fine-woolled sheep.

Hogs.—Difference of opinion exists as much on this as on any other subject. I think the Berkshire the best.

The cultivation of *roots*, as a field crop, is not resorted to to any great extent; and as for potatoes, I should beg to be excused—it is beyond my skill. I shall try planting in fall, and recommend early planting in all cases to bear a crop.

Fruit.—I am happy to say, fruit is getting more attention from our farmers, and is a good remunerating crop.

Manures.—The best plan of making manure, I must say, is not so often resorted to as it ought to be and merits. A good yard, well supplied with straw, and cattle kept there, and not allowed to run in the roads, as is too often the case, through the winter, will make and preserve it. A little gypsum used in the yard, after cleaning out of stables, adds greatly to the quality, and makes the premises more healthy and agreeable.

This has swelled beyond my intentions, and will greatly outweigh its merits.

I am respectfully, sir, your obedient servant,

P. FALCONER.

HILLSGROVE, SULLIVAN COUNTY, PA.,
December 10, 1851.

SIR: An Agricultural Circular was received through the Hon. Joseph Casey some time since, soliciting such information on the above named subject as may be useful to embody in the Report for the present year.

I do not suppose I will be able to give any information on this subject worthy of so prominent a place; but, as I have a deep interest in this

branch of our national industry, I will give such suggestions as my limited experience will admit of.

As the culture of *potatoes* is an important branch of agriculture, and one that is exciting considerable interest, owing to the prevalence of disease for the last few years among them, I would state a few facts from observation of several seasons:

Those planted earliest and on light soil have done much the best, viz: from the 1st to the 10th of May. Light, sandy soil, without manure, has turned out a tolerable yield, with scarcely the appearance of disease among them; and being dug as soon as, or shortly after, the vines die, they have kept well through the winter; whilst the same kind of seed planted on rich mould, or planted with barn-yard manure, or stable manure, with the same kind of treatment in other respects, have nearly all decayed. But, under all circumstances, those planted earliest have been less affected with the rot than those planted latest. In those places where marl or peat is to be had; composted with a small quantity of lime, it is the best manure that can be used.

Ground that has just been cleared, or new land, providing the soil is dry, is well adapted to the culture of this crop.

Wheat.—In preparing the ground for wheat we choose fallow ground from which corn has been taken the previous year. The ground should be ploughed at least twice. The first time, the middle or last of June; then harrowed and cross-ploughed in August, and thoroughly pulverized; and the grain put in from the 10th to the 25th of September.

The difference between once or more ploughing varies according to the previous condition of the ground and nature of the soil; if it is clay land, with much weeds and grass on it, followed by a dry season, it will make nearly a third difference.

Wheat put in with drills will give a much better yield than that sown broadcast under similar circumstances. But where drills are not used, the grain is not so apt to be frozen out if ploughed in as if harrowed. I usually sow about one and a fourth bushel per acre.

My system of rotation of crops is to plant corn on the sod ploughed in the spring or fall previous; then sow oats on the same ground the next spring; and after the oats are harvested, plough the stubble and sow the wheat, putting the manure on the top, and put it in with the wheat; from 25 to 30 bushels being an average crop. One dollar per bushel is the price for wheat in this township and for some miles around, it being a lumbering county; but at Muncy, the nearest point where grain is shipped, the price since harvest has been from 75 to 80 cents.

Manures.—Fifty bushels of lime are commonly put to the acre; but this, as with the application of other manures, should depend on the quantity of other fertilizing properties which the soil contains. Those containing much vegetable matter will admit of heavier applications than those that are poor and sterile—in which latter case it should be put on in smaller quantities and oftener; the same with marl and ashes. The best fertilizer for meadows and pasture lands, where it is to be had, is marl; but after frequent applications of this manure, which usually contains a proportion of sulphur, a light application of lime will be found of great benefit, as it neutralizes and continues with the sulphur accumulated from the marl, forming sulphate of lime. The cheapest vegetable manure is to plough under clover.

The actual cost of raising cattle to three years old is about $12, and that is the business to which this county is best adapted.

Respectfully, yours,

AUGUSTUS LIPPINCOTT.

Hon. THOMAS EWBANK,
Commissioner of Patents.

BYBERRY, PHILADELPHIA COUNTY, PA.,
1st mo., 17th, 1852.

Having been much interested in the Patent Office Reports for several years, and feeling a desire that they should be continued, I will answer briefly the questions in the Circular sent me some months since.

As the *seasons* have much to do with the success or failure of agricultural labor, I would say that we have been visited by a severe drought, commencing in June and continuing until October. There was scarcely any rain fell for some months, and the pasture fields, in many instances, were entirely parched up. The corn and potato crops were materially injured, and the turnip crop a total failure. At the present time more than half the wells in the neighborhood are dry, and some springs that have never failed before are entirely dry.

The *wheat* crop is perhaps larger than for several years. I should think a full average crop of 20 bushels to the acre has been harvested. The price is 90 cents per bushel. The Mediterranean is universally sown; its early maturity being proof against the grain-worm, (a very destructive insect that feeds upon the grain whilst in a milky state.) The quantity of seed sown is from 2 bushels to 2½ bushels per acre, from the middle of September to the middle of October, and the crop is generally harvested about the middle of July. Clover and timothy seeds are both sown with wheat, and the quantity of hay grown is about two tons per acre. The clover is generally fed on the farm. The timothy is carted to the Philadelphia market in loads of one ton each, where it has been worth, the present season, $18 per ton.

Corn is perhaps the most important crop raised in this section. A timothy sod is ploughed, in April, five inches; is well harrowed and marked out with a plough four feet each way; and about the first of May the corn is planted, five grains in each hill, and covered, with a hoe, two inches in depth. Compost, made of manure, lime, plaster, and ashes, is applied in the hill.

The corn is worked principally with the cultivator and hoe; three stalks are left standing in each hill; about the middle of September it is cut up and put in shocks of 36 hills each, which are firmly secured with a band of straw near the top. The husking is done the latter part of October, the corn cribbed, and stalks tied up in sheaves and placed in ricks near the cattle-yards.

In consequence of the drought the crop was below the average, though some farmers had sixty bushels to the acre; the stalks are worth $8 an acre. The price of corn at the mills is 70 cents per bushel.

The gourd-seed is the most common variety; but I have obtained an excellent kind by mixing the gourd-seed, Cooper, and Oregon, in which

are combined large ears, deep grains, and small cob. This is the best variety that I know of.

The crop of broom corn was good, but the price is so low that many farmers will relinquish its cultivation another season.

Oats are generally sown after corn, as soon as the ground can be put in order in the spring—3 bushels of seed to the acre—producing in some instances 70 bushels to the acre; average crop 40 bushels—worth at present 40 cents per bushel.

The *Dairy business* is not extensively carried on; most farmers consider it more profitable to sell hay. A good cow will make 200 pounds of butter in a year, worth in Philadelphia 20 cents per pound. Fresh cows are worth $30 each. A few cattle are fed through the winter, and sold to butchers in the spring.

Potatoes are not extensively cultivated; the crop was materially injured by the drought; 200 bushels to the acre is considered a good crop. Large potatoes are worth at the present time in Philadelphia $1 per bushel.

Roots.—The ruta-bagas (of all the root kind) are the best for feeding stock; but are very little cultivated.

Turnips are sown among corn, and frequently large crops are grown in this manner; but, as I mentioned before, in consequence of drought, there were very few grown in this vicinity the present season.

The best breeds of *hogs* are the Berkshire and Chester county, which will weigh, if well fatted, when one year old, 300 pounds. They are not much raised for market, but principally kept to consume the offal about the farm.

Manure.—As I remarked last year, the main source of manure is the barn yard, where the straw, cornstalks, and refuse of all kinds are collected. Loam, leaves, &c., are hauled in through the fall and winter; and composts of muck, lime, and plaster are often made. Plaster is universally sown on clover in the spring with beneficial effects; and lime is applied generally on wheat stubble at the rate of 40 bushels per acre.

Guano has been used in small quantities, principally on wheat, with good effect; but the high price prevents its coming into general use.

Respectfully,

JAMES THORNTON, Jr.

Hon. Thomas Ewbank.

North Whitehall, Lehigh County, Pa.,
January 19, 1852.

Sir: Your Circular, requesting information on the various branches of agriculture, was duly received.

Permit me to offer an enlarged plan of a *barn*, (with a slight variation to correspond to size,) which I built in 1850, with a view of housing everything that may be raised and grown on the farm—making the most and best manure, and at the same time promoting the health of the cattle.

Fig. 1 represents a perspective of a barn calculated for a farm of 150 acres, seen from the southeast, standing on the margin of a western slope running towards the south. The main building to be 92 feet in front, facing towards the south by 40 feet wide, and 18 feet high, with an addition on the northeastern corner of 22 by 72 feet, and likewise 18 feet high, which gives the eastern side a depth of 112 feet, with a cellar extending under the whole building, a portion of which may be partitioned off for a root-cellar for storing roots and vegetables; a portion may be used for storing wagons, sleds, and implements when they are not used; and a portion may be possessed by a stationary or other horse power for threshing grain, cutting cornstalks, hay, straw, &c.; and the residue for depositing manure. On the rear wall, in the middle of the building, a cistern should be constructed to receive the drainage of the manure pile; the bottom of the cellar in front should be nearly on a level with the ground on the open side, and sloped in such mannerthat all the liquid may readily run into the cistern.

The manure is thrown through trap doors into the cellar, in the rear of the animals. On an improved farm there can always be more straw raised than can be used for litter. A surplus of straw will then be on hand to increase the manure pile, which should be spread evenly and at suitable intervals on the manure pile; and, as the urine voided by the animals will not be sufficient to moisten all the straw, frequent waterings will be found necessary; and where no hydrant or other running water can conveniently be had, cisterns should be constructed to provide for a sufficient supply of water.

Young cattle may be kept, during winter, on the manure heap; and, indeed, I find it to be of great advantage to have cattle on the manure heap, especially when much straw is thrown on, to have it trodden in, as it will more readily absorb the liquid, and prevent the waste of gases.

Fig. 2, shows the interior of the barn; AAA, the entry; B, horse stalls; C, cattle stalls; the animals stand on a platform six inches high, having a slope of two inches towards the rear of the animals, there forming a gutter to receive the manure; EE, &c., are trap-doors in the gutter which admit the manure to be passed into the cellar; DD, &c., doors; F, a trap-door admitting the surplus straw to pass into the cellar on the manure heap; GGG, three threshing floors, two of which may be used as bays for storing grain, hay, or straw; H, bay; I, granary.

As regards the health of the cattle, I find this plan greatly preferable to the old fashioned bank, or Swiss barns, which have their cattle-stalls in the cellar, or lower story, generally too damp to be wholesome, which, by following nature, may readily be recognised to be so; for example: in a warm summer season, cattle never show a disposition to go into their stalls in a bank or Swiss barn; while my cattle have, ever since I have stalled them in my new barn, every evening, summer and winter, manifested a disposition to go into their stalls, which are in summer cool and airy, and free from any pungent smell. I have made it a practice to clean the stalls daily, and strew loam on the floor, which absorbs the gas and other nauseous odors, rendering the apartment cool, and, by proper ventilation, airy, and thereby acquiring a valuable addition to the manure pile, which, especially in summer seasons, when cattle run in pasture, may be greatly augmented, as their excrement is then more watery, and, consequently, more loam and litter are required to be

mixed with the excrement, to absorb the liquid and odors; while, on the other hand, if cattle be permitted to remain during the night in the yard, this acquisition is principally lost.

I had almost forgotten to acknowledge the receipt of a package containing a variety of German *garden seeds* in the spring of 1850. The result was, several kinds of seeds did not vegetate at all; the others, with the exception of one kind, produced only inferior vegetables; of the seed labelled "*German white fall turnip*," only a few grains vegetated, which produced enormous turnips. These I have preserved for seed. Last season I raised a considerable quantity of seed of said turnip, which I have distributed among my neighbors and others; but the last season was so uncommonly dry, that no fair sample could be raised. I have also to acknowledge the receipt of a copy of the Patent Office Report for 1849—agricultural.

Very respectfully, yours,

EDWARD KOHLER.

Hon. THOMAS EWBANK,
Commissioner of Patents.

HARRIS TOWNSHIP, CENTRE COUNTY, PA.,
December 24, 1851.

SIR: In reply to your Circular, the following notes of our agricultural position and prospects are at your service. Those referring to stock and dairy management are contributed by Mr. Samuel Gilliland, of this township, and are the results of his personal experience.

Situation and Soil.—The floor of Penn's and Nittany valleys is almost wholly limestone clay, with remnants here and there of overlying slates and sandstones, which compose the mountain boundaries. The limestone beneath is broken and cavernous, forming natural and perfect drainage, and rendering the soil, though naturally heavy, warm and dry. Penn's valley and Buffalo valley, with the connecting narrows, offer an inviting route for a railroad in a direct line between Pittsburg and Easton, *via* the Anthracite coal regions.

Manure.—A large proportion of the farm-buildings are near the streams, for convenience of water; and in too many cases the richest half of the manure is washed away.

Clover grows with the aid of plaster, and is much depended upon for meliorating and enriching the heavy soil. Its large roots, in decaying, break up the solid texture of the soil, and render it permeable to air. Most farmers sow clover after taking two crops of grain, and many sow it in the cornfield after the last working, preparatory for wheat. Plaster is universally used, and could not be dispensed with at present. Lime is but little used, and is not so manifestly beneficial here as in other places; yet examples of its profitable use are not wanting.

Culture.—Our most successful farmers now plough 6 to 8 inches deep. But many are discouraged from deep ploughing, both by the heavy texture of the soil and the bad results which usually follow from bringing up a thick layer of clay at once. The subsoil plough has scarcely been introduced. It would seem useful in breaking up the subsoil and preparing it for the surface. If brought to the surface raw and

fresh, it bakes, and becoming impervious to air, the plants growing in it perish.

Crops.—Wheat and Indian corn are the main crops. Of 100 acres of clear land, 40 acres are usually in wheat; 30 in corn; 10 in oats, rye, potatoes, and sometimes barley; 10 acres of mowing ground and 10 of pasture; 12 to 15 acres of good timber are required for such a farm, but the mountains supply much timber to the valleys.

Four horses are necessary here to work a farm of this size, and it keeps about 20 sheep, 12 to 15 head of horned cattle, (4 to six cows,) and 12 to 15 hogs—kept over one winter. The average yield of wheat in 1840 was 20 bushels per acre. In 1851 this township would not average more than 10 to 15 bushels. Corn is, at present, the most profitable crop. Wheat has not averaged over 75 cents during the past year. The price of land is from $10 to $60 per acre.

Fruit Trees grow and bear as well here as in most parts of the middle States. In the lap of the mountains (elevated ground close to the foot of the steep ascent) frost is seldom destructive, and crops are sure; but the trees become exhausted, and the fruit is not as fine as in the valleys. Apples yield a full crop once in 2 or 3 years, and fail entirely once, perhaps, in 10 years. Peaches bear abundantly once in 4 or 5 years, and fail once in 5 or 6 years.

The finer kinds of cherries and native grapes do well where they have been tried. Plum trees are as yet free from black knots, and there seems to be no difficulty in arresting them if cut away promptly. The trees bear abundantly, but the curculio takes the lion's share. This insect was not so numerous as usual the past season. Keeping the soil of the plum-yard bare and firm, and allowing free ingress to pigs and poultry, have proved effective against the curculio, and aid the growth of the tree.

A majority of the peach trees in the country have been destroyed by the yellows; and the disease, through an ignorance of its nature, has been more advanced than checked. Trees affected by the yellows ripen their fruit prematurely, and seeds of these are too often planted in the hope of raising early sorts—most of the native seedling peaches being rather late. Pear trees flourish, compared with their growth in other places; yet very few good pears are to be found. The common sorts are very austere.

Of cherries, the common mazzard, the late pie cherry, and the morello are the only kinds generally known. The mazzard is a very poor bearer—often of bitter and very small fruit; the morello is subject to black knots; and many, judging all cherries by these examples, swelter through the heats of early summer without enjoying nature's own refreshing and grateful provision for the season.

In a few years there will be a better supply of fruits. Young orchards are springing up, and are beginning to receive their due share of culture. Of apples most farmers have orchards of from 50 to 100 trees, mostly grafted, but generally with a meagre assortment.

Mr. Christian Dale, a leading orchardist and farmer of this township, says: "I consider good apples the most wholesome of all fruits. I have a family of 12 constantly, besides day-laborers. We use 5 barrels of cider and 18 bushels of apples to make apple-butter for a 12 months' supply, and 1 or 2 barrels of watered cider for vinegar, considering it

preferable to any made from poisonous alcohol. One family will consume *two hundred bushels* of apples in a year, if they have an orchard yielding a full supply of the best sorts, in regular succession, say—

" 100 bushels summer and fall apples for eating, cooking, drying, &c., at 25 cents per bushel	$25 00
100 bushels best winter apples, at 50 cents	50 00
5 barrels cider, at $2	10 00
18 bushels sweet butter apples	4 50
2 barrels watered cider	2 00
Value of apples consumed in one large family	91 50

" Where a farmer has not a good supply of fruit, a great deal of money is carried to stores to purchase molasses and other substitutes, not so good or so wholesome for a family of children."

" *Stock and Dairy.*—The average stock of dairy cows here is $16; the yearly produce of butter 190 pounds. We strain our milk into earthen crocks; in warm weather we keep it in cool spring water, in a stone spring-house; in winter we keep it in the cellar till cream rises, which requires about 36 hours. Keep the cream in a large crock till it gets thick, then churn. The average price of butter is 10 cents per pound, and the cost is from 8 to 9 cents per pound. The milk is fed to pigs.

" The cost of raising neat cattle till 3 years old is $17, and their value at that time is $21. During the first 2 months of feeding corn to a steer of that age, 100 pounds of corn will add 15 pounds to his weight; after that, not so much. Of pork it will add 20 pounds.

" To break steers to the yoke, take them when 2 years old, get the yoke on, and tie their tails firmly together, to prevent them from turning the yoke; then put them into a field and let them walk about, to become familiar with the yoke. Get a long hickory, and, by its motion and the word of mouth, you can get them to follow. If you have a yoke of cattle that are broken, put the young ones behind them; hitch to a sled or log. Good breakers of oxen never put a line on them.

" When a *mare* is with foal, she should be worked but gently; she should not be confined closely; she may be worked till her time of colting. Let her rest 7 or 8 days after she has her colt. When the colt is 6 months old, take it from the mare; in good weather, keep it in a grass lot, but stable it in cool or stormy weather. Put a halter on it and tie it to a manger, so as to oblige it to raise its head up when it eats. If a stud, let the manger and the windows be quite high, so as to strain the muscles of the neck. He should occupy a separate stable after he is 18 months old. Occasionally let him out into an open lot for free exercise. When a colt arrives to the age of 2½ years, it is time that he should be bitted. It is of great consequence that he should be at first gentled by some person who understands the management of horses; as *first impressions* are never entirely removed from man or beast."

Seeds.—The seeds distributed from the Patent Office generally come under the care of the farmer's wife or daughters. Many new, and some quite superior, vegetables have appeared—some so entirely new and

strange that neither as gardener nor cook could the good housewife make out what to do with them. These seeds, collected in far corners of the earth, and presented to the quiet and grateful tillers of the soil, are seeds also of good will—blessings both to the giver and the taker.

Very respectfully,

WM. G. WARING.

Hon. THOMAS EWBANK,
Commissioner of Patents.

LEWISTOWN, MIFFLIN COUNTY, PENN.

SIR: Your "Circular" of August, 1851, was handed me by Colonel Butler, the worthy postmaster at Lewistown, with a request that I would respond to its inquiries. This I have briefly done in such cases as a personal experience of 30 years in agricultural pursuits would enable me to do with some sort of confidence, leaving to others the task of replying on subjects with which I was not conversant, or could not speak with the necessary precision. Doctor Rush has said that there were more false facts in medicine (by which terms he designates the false conclusions so often drawn from inadequate experience) than were to be found in any other science; but I must think, had the learned Doctor turned his attention to agriculture, he would have found that there were more of this kind of facts current on subjects connected with this pursuit, and incorporated with its literature, than are to be found in all the other callings taken together. The thousand-and-one infallible remedies for the potato rot, the smut and mildew in wheat, the peach destroyer, the bee moth, &c., &c., are a sufficient confirmation of at least this one *veritable* and humiliating fact. Such will ever be the case as long as men will persist in publishing their crude and visionary theories and fallacies, resting, perhaps, upon a single ill-devised experiment on subjects wherein, to arrive at any satisfactory conclusion, it would require long and patient investigation, and numerous and carefully-diversified experiments.

Soil.—The valley of Kishacoquillis, in which I have resided the last 30 years, comprises the largest and most productive body of land within the county of Mifflin, and will bear a comparison in agricultural improvement and fertility with the finest portions of our State. The soil is highly calcareous, and is based upon the lime-rock No. 2, in the geological series of Professor Rogers. Flint or horn-stone, in rounded masses, has been in many districts profusely scattered over the surface; and such as are so large as to interfere with the plough or harrow are hauled off the fields. But in all these localities the same material in smaller fragments, diminishing to the size of coarse sand, enters largely into the composition of the soil; and although wheat suffers more upon the flinty grounds from exposure to the frosts of a hard winter, yet during the spring and summer months it will outstrip, in vigor of growth and product, the grain upon other lands which, in the early part of the spring, had presented a much more promising appearance. Where this ingredient most abounds, our heaviest crops of corn are raised; and there can be no doubt that our

flinty lands retain moisture better, and sustain a severe drought longer, than any other.

Wheat.—A clover-sod is turned down for wheat in April or May, with a three horse plough, as deep as it can be well laid over. The ground should be rolled and harrowed before and after harvest, to pulverize the soil and keep down weeds. Before sowing, the ground is stirred and harrowed smooth. Seeding commences the 1st of September, and harvest about the 1st of July. A bushel and a half is allowed to the acre when drilled in; a peck more when sowed broadcast. Our wheat crops have certainly been increased from 10 to 15 per cent. by the general introduction of the drill.

The average product is between 15 and 20 bushels per acre; but 30 is not uncommon amongst our good farmers, and fields have reached even 40 and upwards. Average weight, 61 or 62. In the year 1845, wheat averaged 65; and some Mediterranean reached the unprecedented weight of 69 pounds. Some white flint, the seed of which I got from Rochester, New York, weighed over 68, and was the most beautiful specimen of wheat I ever beheld. *This* and the white blue stem are two of our best kinds, and the latter is the one most generally now cultivated. The average price of wheat at our nearest market (at Lewistown, on the Juniata river) in 1851 was 80 cents. From this place there is a canal and railroad transportation of 170 miles to Philadelphia, and about the same distance to Baltimore. The best remedy yet found for Hessian fly is plenty of manure and good cultivation; for this pest, like other parasites, preys upon the weak and sickly. The bearded wheats, and particularly the Mediterranean, resist its ravages better than the bald kinds. I have never been troubled with weevils, nor have I heard many complaints from this cause.

Corn.—Guano is not likely to be much used for this crop so long as gypsum, which is much cheaper, is attended with its present beneficial effects. Our system of culture is to turn down a clover sod with a three-horse plough late in the fall, any time through the winter, or as early as possible in the spring. By this means we escape the ravages of the cut-worms, which are destroyed, in their embryo state, by being turned up to the frost. The ground is effectually pulverized by repeated harrowing without turning the sod, and lightly scored out across the furrows at the distance of 3 to 3½ feet apart in the rows. No preparation is used for early planting; but when late, there is much time to be gained by soaking the seed over night and rolling it in gypsum. The best times for planting here are the last days of April and first week in May. As soon as the corn is fairly up, it is harrowed and plastered at the rate of at least half a bushel per acre; one-half of this quantity, in combination with wood-ashes, has been found to be equally efficacious. The plough and cultivator are the only implements afterwards used.

Varieties are ever changing from intermixtures with other kinds. The sorts preferred here at present are the larger yellow-grained, and particularly such as ripen earliest. To many it may not be known that there is much advantage to be gained by occasionally changing our seeds of wheat and corn for the better kinds of northern climes. Such seeds, in addition to their early maturity, acquire increased vigor when transplanted to a more genial climate; whilst the very reverse (as I have found at some cost) will be the case with regard to seeds brought from

more southern latitudes, and which will require many years for their acclimation. Corn, which I raised from seed of the early Sioux from Maryland, was much damaged by our early frosts. From these facts I am led to infer that the Mediterranean, from its early maturity and hardy properties, must be a northern wheat, and has probably reached us through the waters of the Black sea. Our average crops of corn may be safely estimated at 30 bushels; yet 50, amongst our good farmers, is quite as common, and, under very favorable circumstances, even 80 bushels have been reached. Did our farmers generally take the time to chequer the ground, and give it the additional culture required by this process, the average product might be increased at least twenty per cent. The clover sod has the same effect of mulching above ground, in retaining moisture around the roots of the corn; and, with the aid of gypsum, has more than doubled the product of this grain. Nothing is so detrimental to corn as working it when wet, and it is never too dry for this purpose. The most economical way of feeding corn is to have it ground with the cob, and to give it raw to horses and cattle, and cook it for hogs. The cheapest pork I ever made was with boiled potatoes, mashed while hot, and mixed with one-third or one-half cob meal, scalded with the water in which the potatoes were boiled, and made into a thick slop, slightly salted, and well peppered with hickory ashes. By having two vessels, I kept the slop in a state of fermentation, which improves its fattening qualities very much.

Oats.—For this crop our corn stalks are turned down as early as possible in March or April, and sown at the rate of 2 bushels to the acre, and harrowed in. The manure is strewn upon the oat stubble, and turned down to wheat, to be sown the following spring with clover. When we have two fields of corn, one of them should be sown after the last ploughing with clover. This is a much better course than to leave the ground so long fallow, as, without injuring the corn, it affords a couple of months of good pasture the following season before it is broken up for wheat. Oats are considered our most exhausting crop; but by means of manure the land is kept up to the proper tilth, and we gain an extra crop by it. The average yield of oats is from 40 to 50 bushels per acre. The earliest are generally the best, exceeding in weight the later sown.

Rye, Barley, Peas, and Beans.—Small quantities of the first two of these grains are occasionally raised, but they do not hold a regular place in our system of rotation.

Clover and Grasses.— Our wheat fields are sown in March with clover seed, at the rate of 4 quarts to the acre, followed by at least one peck of plaster as soon as the young clover is up. This application, in addition to the vigorous growth it promotes, is a protection from the effects of drought, so often fatal to the tender plants in May. Negligence in this respect has been often followed by a total failure of the clover crop. Of the ill consequences of such a failure, it would be difficult to form an estimate, as, in addition to the loss of hay and pasture, it deranges the whole routine of operations, and reduces the land, by compelling the farmer to stubble in the fields in which the clover had failed. Clover should be so thick as to cover the ground, to the exclusion of everything else. From the foregoing, it will appear that clover, with us, is mown but once, and pastured but one season—a rotation which requires more seed, but is

a great improvement over the old system of cutting and pasturing the fields two seasons. Clover is not strictly biennial, but much of it dies out after once blossoming; and some years ago it was not an uncommon thing to see fields which had been well set with clover kept up for pasture until they were converted into a stiff, blue-grass sod.

Clover, in combination with gypsum, has been the means of renovating our exhausted lands, and has proved to be, after long experience, superior in nutritive and fertilizing properties to every other fodder. In fields intended for mowing, many sow a mixture of timothy seed, which helps to keep the clover from lying down, and is thought to improve the hay for horses. It is better to sow the timothy the fall previous, immediately after the wheat has had its last harrowing, or after the drill, and, if possible, before rain. As soon as vegetation fairly commences in the spring, we sow about half a bushel of plaster to the acre upon the clover fields, both for hay and for pasture; and in June, when about one-half of the blossoms have turned brown, we make from the fields that are mown from one to two tons of hay, according to the season. As this kind of hay is, of all others, the most injured by rain after it is once dry, it is all important that it should be safely housed.

The best grass for natural meadow, if not too wet, is timothy; if wet, red-top is highly recommended; but, in the latter case, it is better to underdrain. *Natural meadow should never be ploughed unless it is desirable to convert it into upland.* If it should become sod-bound, or the timothy runs out, the surface should be well torn with a heavy, sharp harrow, both ways, in September, and sowed with timothy seed, and in the spring with clover and gypsum, to be succeeded by a top dressing of manure. As the clover dies out, the timothy takes its place, and becomes thicker and stronger than ever.

Experience here is adverse to turning down green crops as fertilizers, and few, I believe, have repeated the experiment. In two instances in my own immediate neighborhood wherein heavy crops of clover were ploughed down in full bloom upon land of excellent quality, the immediate effect, at least, was highly pernicious, as evinced in an almost total failure of the succeeding crop of wheat. I am disposed to attribute this result to the mucilaginous and saccharine matter with which the plant in this state so much abounds, and which, by being buried in the ground and subjected to the united influence of heat and moisture, takes on the acetous fermentation, and thus becomes so detrimental to healthy vegetation.

I do not say that such consequences always follow the ploughing down of green crops, for here experience would seem to be against me; and many circumstances—such as the state of the ground, temperature, rain, or drought—might combine to bring about or prevent such a result. Be this as it may, however, there can be nothing gained by the practice, as clover loses none of its fertilizing ingredients by drying; and hence we find that a heavy mat of dead clover, which has been trodden down by our cattle the previous season, is as good as a coat of manure; and for this reason the farmer whose staples are wheat and corn should not overstock his farm through the summer. A good rule is to keep no more than can be conveniently wintered. Our most thrifty farmers buy up a lot of poor bullocks from the West, in the spring, to feed through the winter; and by this means the heavy crops of straw, which would other-

wise be in a great measure lost, are passed through the stable for bedding, and, by the additions there acquired, are converted into rich mines of manure. The beef thus fattened always commands, in the spring, the highest prices.

Root Crops.—With the exception of Irish potatoes, root crops are not cultivated as food for stock, simply because corn is cheaper. If one of our farmers was asked why he did not grow sugar-beet or ruta-baga, he would most probably say that he could not spare the time; and such is the fact, as he well knows that he can raise a bushel of corn with less trouble than he could a bushel of the turnip or beet; and one bushel of corn is worth three of the roots.

The largest and finest potatoes are grown under a clover sod, previously spread with stable manure; the cuttings are planted 8 inches apart, in every third furrow, close to the land side, and well strewed with gypsum before the sod is turned over them. This application, as I have proved from numerous experiments, both improves the quality, and, in dry seasons, more than doubles the quantity. After the ground dries off, it is to be harrowed with a light sharp harrow until *the surface is perfectly smooth;* and if the sod is likely to be turned, the harrow should be preceded by the roller. When the tops appear, each row is to have a stroke of the harrow to disentangle any plants which cannot readily get through. When the tops are a foot high, a cultivator is passed between the rows, which are afterwards enclosed by the plough in a nice box of earth. All that is required afterwards is to pull out by hand any grass or weeds which may arise in the rows, and destroy such as come up in the middles with the cultivator. By the above simple and economical process, I have never failed to produce finer crops of potatoes than I could grow on ground that was fallow under the most careful culture. For planting, I prefer a large potato cut small; which, having the strongest buds, will put forth the strongest shoots, and we will always find the size of the tubers will be proportionate to that of the stalks. But one or two good eyes are left to each cutting. Various kinds are planted for early use—amongst which the mercer is perhaps the best, and also keeps well. The finest variety we have for a late crop is the pink eye. I regret to add, that crop after crop, and some of the most promising we have ever had, including every kind, have fallen a prey to the mysterious destroyer so universally prevalent. All the potatoes which have ripened before the 1st of August (that I have planted) have escaped the rot; if others have been alike fortunate, the hint should not be lost. Our late potatoes are gathered when the ground is dry; which is put in with the rest of the field in wheat.

Fruit.—Abundance of fine apples are raised everywhere throughout our county, but prices are too low to make it a profitable crop. In fruit seasons the best apples are frequently sold in our orchards for 12½ cents a bushel, and cider at the press for $1 per barrel. The varieties that keep best are the Newtown pippin, the pound or fallow-water, the gray-house, cart-house, smoke-house, and green pippin. The Rambo, Spitzenberg, French pippin, yellow bellefleur, and black Vandervere, are the favorite fall and winter fruits. The peach once flourished everywhere throughout our State; but, for many years past, the worm and the yellows have been so fatal to it, that its culture is almost abandoned. The only remedy yet found for the yellows is the extirpation of the whole stock

of trees on hand, replacing them with healthy kinds from uninfected districts. Trees have often been preserved a long time in a healthy condition by constant vigilance in picking out the worms with a sharp-pointed knife, and pouring boiling water around the roots spring and fall. Tobacco-leaves are much spoken of as a preventive; also, an ointment of train-oil and tallow, containing a small portion of mercurial ointment. There is an accurate colored engraving of the peach-destroyer, (*Egeria exitiora*,) in its winged state, in Say's Entomology. The blight in pear-trees may be avoided by ingrafting the Seckle, the Bartlett, and other hardy varieties of recent origin upon *seedling stocks*.

The Vine.—My experience with the grape has been sufficient to prove that its culture might be turned to profitable account, particularly in the vicinity of our larger towns and cities, where there was a market for the fruit. I had, for many years, from one to two acres under cultivation. After unsuccessful trials of the French and Rhenish vines, I finally turned my attention to the native kinds only, of which I found the Eichelberg, or York Madeira, and the Catawba the best. From the former I made a red wine, without addition, which somewhat resembled good claret, with a very pleasant flavor of the fruit peculiar to itself. From the Catawba, with the addition of some sugar at the press, I made a rich, strong wine, which now, after twelve years, retains all its good qualities. This fine fruit is seldom left upon the vines till perfectly ripe; and after it appears so to superficial observers, it should be permitted to remain several weeks, during which time the pulp becomes softer, the skin thinner, and the juice richer and more saccharine. One principal cause of failure in the culture of the vine arises from planting it in too rich a soil, from which it acquires an unnatural luxuriance of growth; the bearing-shoots will be long-jointed and spongy, with two much pith; the wood does not become sufficiently ripened, and is attacked with mildew, and perishes in the winter. In a congenial situation the bearing shoots will be small, short jointed, and solid. A light sandy or gravelly soil, with a southern exposure, should be selected. Very little manure is required; and a compost, into which the virgin soil from the woods and fence-rows enters largely, with a small addition of ashes and foreign or domestic guano, is the best.

Manures.—Lime has been used to some extent, and with various results, and its complex operations upon different soils are still involved in much obscurity. When mixed with argillaceous earths, it has a highly beneficial operation, not possessed by any other agent, of changing the texture of the soil, rendering it more crumbling and permeable to water, and assimilating it to that which is naturally calcareous. When applied to a good limestone soil, its beneficial effects, of course, are not so apparent; but even in this case we have the most decided proof of its favorable operation in the change it produces in the suite of plants which are the spontaneous growth of every kind of soil. In fields which have been well limed, instead of the blue grass and sorrel, so injurious to our crops, there will spring up the weeds peculiar to the richer soil of our gardens, such as the lamb's quarter, (*Chenopodium album*,) mallows, (*Malva rotundifolia*,) and Spanish needle, (*Bidens bipinnata*.) When applied with a view to its durable operation upon the soil, from 100 to 200 bushels should be allowed; and I have reason

to believe that, in combination with manure, double the highest of these quantities might often be advantageously used. It is applied in smaller portions with great advantage—in many places, as a top dressing; but in such cases its good effects will be proportionately less permanent.

Very respectfully, yours,

JOSEPH HENDERSON, M. D.

Hon. THOMAS EWBANK,
Commissioner of Patents.

RISKWAYVILLAS VALLEY, MIFFLIN COUNTY, PA.,
December 18, 1851.

SIR: In reply to your Circular of August last we beg leave to state, first, as to *wheat:* although over 40 bushels per acre have been raised in this region, it is not supposed that the average yield of the best farmers would much exceed 20 bushels per acre. The average yield of Mifflin county, however, it is believed, is not more than 15 bushels per acre.

Guano has been but little used in this region. We have sown two-thirds of guano, mixed with one-third of plaster, broadcast previous to harrowing the ground in preparation for drilling in the wheat. Where the ground was poor, it was put on thickly; and where the ground was rich, less was put on. The result was an extraordinary crop all over the field. The gain cannot be stated, as it was not applied in equal quantities.

Fallow ground in this region is generally ploughed twice; somtimes it receives three ploughings from 6 to 7 inches deep, with intermediate harrowings.

The most general preparation of seed wheat is to let it become thoroughly ripe, and to separate it from the seeds of all kinds of weeds. The time of sowing is from the 10th of September to 1st of October.

Harvest comes on about the 1st of July. The best remedy for the Hessian flies is to manure the ground well; and, if the flies attack the wheat in the fall, to turn the cattle on it in dry weather, so that the ground may be well tramped, or to roll it with a heavy roller.

We are not much annoyed by weevils. No general system of rotation prevails. The common practice is, first, corn, or a close sod; plough late in the fall or early in the spring; next, oats. The ground is then manured, and the wheat drilled in at the rate of one and a half bushel to the acre. White blue-stem is the most productive; Mediterranean is less esteemed than formerly. Clover seed is then sown in March or April, and not unfrequently timothy seed is sown; it ought to be sown immediately after the drill. The ground is then mowed or pastured for one or two years.

Clover ground is also fallowed to a considerable extent, and not unusually wheat is raised on a clover lay. After the ground is first mowed, the clover is permitted to grow up previous to ploughing; the harrow is passed over it in the direction which it is intended to plough. After the clover is carefully turned under, the harrow or cultivator, or both, should be freely used to pulverize the ground previous to drilling in the wheat. Although the yield per acre of the better farmers is, by a judicious system of manuring, on the increase, and, although the use

of the drill has increased the yield per acre in general, yet, upon the whole, the fertility of the soil is supposed to be decreasing.

Our nearest market is Lewistown, and the average price of wheat for 1851 is about 80 cents per bushel.

As the difference in the cost of raising a bushel of wheat in various parts of the United States may be a matter of interest, we present the following estimates:

Estimate of the cost of producing a bushel of Wheat in Mifflin county, Pennsylvania.

Interest on land (one acre) one and a half year, $70, at 6 per ct.	$6 30
First ploughing one acre	1 50
Twice harrowing "	40
Second ploughing "	1 00
Twice harrowing "	40
Seed, 1½ bushel "	1 50
Drilling "	40
Harvesting "	1 50
Hauling and stowing in barn	40
Threshing "	1 60
	15 00

Which $15 ÷ 20 is the average 75 cents, the cost of raising a bushel of wheat.

Estimate of the cost of producing a bushel of Wheat in the State of New Hampshire; by Henry Huntoon, of Unity, N. H., 1847.

Seed, 2 bushels, one acre	$4 00
Interest on land	2 00
Ploughing	2 00
Harrowing	1 00
Harvesting	3 50
Threshing	2 50
Manure	7 00
	22 00

Costing, at the rate of 20 bushels to the acre, $1 10 to raise a bushel of wheat in the State of New Hampshire.

Estimate of S. M. Bartlett, of Lasalle, Munroe county, Michigan.

Interest at 6 per cent. on one acre, worth $15 00	$0 90
Twice ploughing	2 00
Twice harrowing	50
One and one third bushel of seed	1 00
Sowing and harrowing	50
Furrowing and clearing furrows	50
Harvesting, &c.	1 50
Threshing and cleaning	2 00
	8 90

Which, at 25 bushels, the average per acre, would be thirty six and four-fifth cents for producing a bushel of wheat in Michigan.

Mr. Bartlett raised an average of $25\frac{1}{8}$ bushels of wheat for 8 successive years, at an average cost of $34\frac{3}{4}$ cents per bushel.

From the preceding statements, it would appear that the cost of producing a bushel of wheat is 66 per cent. more in New Hampshire than in the fertile and easily cultivated soil of the State of Michigan.

In 1848, we sowed 2,000 pounds of guano, mixed with one half ton of plaster, on a 15-acre field of *corn*, which had been under cultivation for 70 years; and which, owing to excessive cropping, produced only a half crop of clover the previous year. The mixture was sown broadcast immediately after planting the corn. After the corn was from three to four inches high, it was harrowed, and soon after the cultivator was passed between the rows. When the corn was from eight to twelve inches high, it was ploughed about three inches deep, and the surface containing the guano thrown in towards the rows. The yield was about 50 bushels to the acre. The following spring this field was sown with *oats;* and, although the outcrop this year was short in the straw, and light in general, the yield of this field was over 40 bushels per acre. The straw was much longer than any we noticed in the neighborhood during that season. While growing, this field of oats had a remarkably striped appearance, which was visible ata considerable distance from the field. Although the oats were even in length all over the field, the parts which had been occupied by the rows of corn were of a much darker green than the parts between the rows; proving conclusively that the effect of the guano was not all exhausted in the first year upon the corn, but that it contributed largely to the production of a fair yield of oats. When ploughed for corn, about one half of said field was subsoiled with Prouty & Mears's subsoil plough. No difference, however, could be noticed between the part which had been subsoiled and the part which had not received that extra work—neither in the corn nor the oat crop, nor in the wheat crop which followed.

The cost of the guano and plaster, and the cost of preparing and applying it, was $4 45 per acre. The gain of the guano alone could not have been less than 300 per cent.

The average crop of corn of the better farmers is about 60 bushels in favorable seasons.

The cost of producing a bushel of grain varies much, as well as the number of bushels produced on an acre, and depends on the quality of the soil, as well as a judicious application of manure and cultivation. On the whole, we put the average cost of producing a bushel of corn at 35 cents per bushel, and the average number of bushels produced at 36 bushels per acre. The average yield of oats we estimate at 28 bushels per acre.

Oats are believed by some to be very exhausting to the soil. This opinion, we think, is in a measure owing to the looseness of the soil after a crop of oats; which, on soils naturally friable, causes wheat sown after oats to freeze out, or winter-kill. As wheat generally follows a crop of oats, a coat of barn-yard manure ought always to intervene between the oat and wheat crop. Land treated in this way seldom fails of producing a good crop of wheat, and will, if properly managed, increase the fertility of the soil.

The improvement of the breeds of *horses* and *neat cattle* has been much neglected. Some superior breeds of cattle have been attended to; but as a proper system of crossing and improving has not been attended to, they have generally degenerated. The recent organization of our State agricultural exhibition at Harrisburg has done much to attract the attention of farmers to this subject, and will no doubt excite them to action.

What we have stated in relation to neat cattle will also apply to sheep and hogs.

The cultivation of *fruit* is receiving increased attention; but is yet, by many, too much neglected. In the townships of Union and Menno, in this county, extensive orchards abound, containing most of the better varieties of apple trees. Cherries and plums are here, also, tolerably plenty. Pears and peaches are more scarce.

I find no difficulty in preserving the peach tree. My method is to keep the trees well mulched, and to apply boiling water to the roots, near the trunk, in the month of April. Before the water is applied, the soil should be removed from about the roots, near the trunk of the tree; and, if any worms have penetrated into the wood, they ought to be laid low by a sharp knife. By mulching, we mean the placing of straw or any other substance around the tree, in sufficient thickness to rot the sod, and to keep the ground moist in dry weather. In no case, however, ought anything of the kind to be permitted in the winter, or in time of snow, as the mice will harbor in it and peel the trees. It should always be applied in the spring, and removed before the first snow in the fall.

Respectfully, yours,

SHEM ZOOK.

SWATARA FALLS, NEAR MIDDLETOWN, DAUPHIN CO., PA.

SIR: Having been favored with a copy of your Circular, soliciting information relative to agricultural crops, modes of farming, &c., &c., I cheerfully comply so far as my experience and knowledge of the various points belonging to rural affairs will enable me to do so. Before I proceed, however, to answer the points set forth in your Circular, permit me to make a few general remarks on this important subject, confining myself entirely to my own county. In this county the practical farmer has long since accomplished all that can be accomplished without the aid of science. Inhabited for years by an industrious German population, the experience of the father handed down to the son by tradition, the cultivation of the soil has been brought to great perfection; but not until within a few years has the aid of science been sought and studied by our farmers generally; and great improvements have already been made in the productiveness of the soil, as well as in the saving of labor and expense in its cultivation. Within this year a State agricultural society has been formed, with an auxiliary county society in this and many of the other counties of the State. The State society had a fair at Harrisburg, in this county, which far exceeded the most sanguine expectations of its friends. This has given our farmers a new and powerful impulse; and the time is at hand when, by the aid of science, and the experience and industry of our farmers, agriculture in this county will be brought to its highest degree of perfection.

Wheat is extensively cultivated in this section. Guano has been used in the production of this crop, but only within the last few years, in small quantities, by way of experiment. It has not been sufficiently tried to test its value fully, but promises to answer very well. When two crops of wheat are raised in succession on the same ground, the ground being dressed with stable-manure for the first crop, and the guano sowed on broadcast, 300 pounds per acre, and harrowed or drilled in with the wheat in the second crop, in this way, the product of the second crop of wheat will be materially increased. It should be harrowed in immediately when sown, or its value will be much diminished by the escape of ammonia. I think to mix and sow a small quantity of plaster with it would be an advantage in preventing the ammonia from escaping. The average product of wheat per acre is 30 bushels, though 45 and 50 are frequently raised. Time of seeding, from the 1st of September to the 1st of October; of harvesting, from the 4th to the 15th of July. Wheat is never harvested here before it is fully ripe. Some experiments have been made by cutting when in the doughy state; but, as far as I know, this mode has not been approved of. No pains are taken in the preparation of seed, except to have it clean from everything but good, sound, plump wheat grains, which is readily accomplished with the excellent winnowing mills in use here. The quantity sowed per acre, when drilled in, is 1½ bushel; when sown broadcast, two bushels. We plough twice for wheat; and all good farmers prefer ploughing as deep as they can without turning up the subsoil. The average depth is about eight inches. The average yield of wheat per acre is rapidly on the increase here. I have no doubt in ten years hence it will reach 40 bushels per acre. Our system of rotation in crops is, first: when the land has lain in sod 2 or 3 years, we turn down for corn, followed with oats or tobacco; then manure with stable manure, and follow with wheat, sometimes with two successive crops; and sometimes the first is a wheat crop followed with rye, then timothy and red clover; and very frequently the first crop of wheat is followed with grass. This is the most certain way to bring good grass. Sometimes a crop of clover is turned down for wheat. This was much practised before lime was used; but since, the crop is generally taken off before the sod is turned down. This produces a good crop of wheat, but is apt to generate blue grass. The Hessian fly has not troubled us much for some time. The only remedy we know of is late sowing. Weevil, good farmers are not much troubled with here. If a barn is full, clean it out well of chaff or short straw, such as gathers in the mow if not cleansed every year. Stack your grain out one year, so as to leave the barn empty during one winter; then keep clean as above, and you will have no trouble with weevil. The leaves of box-elder, thrown among the grain when housed, will check them considerably. Our old farmers say, to put a flock of sheep in a mow that is full of weevil every night for several months, when the mow is previously cleaned as above, will destroy them effectually. Average price of wheat at our nearest market in 1851, 75 cents per bushel.

Corn is, next to wheat, the principal crop here. Guano is not used in its production, except that, within a few years, a little has been used by way of experiment. There is no doubt but, if properly applied, it will materially increase the product of the crop; but those who have tried are unanimous in the opinion that the same per cent. of increase can be

effected with lime and plaster at a much less expense. The average product per acre is 50 bushels; but from 80 to 100 are frequently raised. The yield per acre is increasing rapidly. Our system of culture is so identically the same as that given in your Report for 1850, from the pen of Jacob B. Garber, of Columbia, Pa., that it is unnecessary for me to give you any more here but a reference to his, found on page 415. Ground and cooked is much the best method of feeding corn to cattle and hogs; if fed to horses, ground and mixed with cut hay is the most economical; for cattle, I prefer it ground with the cob; for hogs, ground without the cob. We have not more than half an average crop of corn this season, owing to the drought. We had no rain to soak the ground from July to November. Average price at our nearest market, 60 cents per bushel.

Oats are much cultivated, and are considered exhausting to land. Quantity of seed sown per acre, 2 bushels; average product per acre, 50 bushels; average price, 35 cents.

Barley and Rye not much cultivated. *Peas and Beans* not cultivated as a renovating crop.

Neat Cattle.—Not many are raised for sale in the county. *Mules* not raised. *Horses.*—Not enough raised to supply the demand for them in our own county. They are not considered profitable to raise.

Hogs.—The Berkshire and Chester county are much preferred here; but our stock needs improving very much.

Sheep.—There are some kept for fattening; but wool growing is not considered profitable here. *Tobacco* is considerably cultivated, and, at present prices, is very profitable. Guano is used with great advantage on this crop, producing a very rapid growth; which is very desirable in a crop that is exposed to so many injuries by worms, and consequently requires great attention. We sow broadcast before planting, and harrow in. It is generally grown in rotation with wheat, oats, corn, and grass, always following corn; and if grown in this way, I am certain it is no more exhausting to the land than corn, and much less so than oats. I have frequently had part of a field in tobacco, and part in oats, both followed with wheat and grass. Both the latter crops were perceptibly better on the tobacco than on the oat-ground, the whole field being situated exactly alike in other respects. The soil, a sandy loam, or river bottom. Average product per acre, 1,000 pounds. Price, from 10 to 12 cents per pound at nearest market.

Potatoes, (Irish.)—Not very extensively cultivated; but every farmer cultivates some; seldom, however, many more than he wants for his own use. At least, our county produces few, if any, more than are needed to supply its own population. The long red, or rowan, are decidedly the most prolific, but the mercer and pink eye are preferred for table use.

Manures.—The best way of preserving stable-manure from waste is to keep it under roof, and throw plaster over it once a week. The plaster prevents the ammonia from escaping.

Plaster is used extensively here, and is annually, about the beginning of May, sown broadcast on the grass at the rate of from 80 to 100 pounds per acre. It is also used by nearly every farmer on the young corn when about two inches high, applied by hand, from 100 to 150 pounds per acre. Some few persons, after steeping their seed-corn in copperas water or saltpetre, throw plaster over it until it is dry by mixing. This is commonly called rolling in plaster. This plan is much esteemed by some few farmers; but the former application is more generally practised.

Lime is much used here, and its use is annually on the increase, and it will no doubt continue to be the principal fertilizer in this section of country for years to come. We have the limestone and coal in abundance in our county, and consequently no fertilizer brought from abroad can ever exceed it in cheapness; it is now sold at 6 and 7 cents per bushel (all over the county) at the kiln, ready to put on the land, and by canal shipped for an additional cent per bushel within a mile or two of the farm where it is to be used. So powerful is its effect on poor soil, if properly applied, that on many farms in this county where it has been used, the value of the land has been increased 200 per cent. with less than 100 bushels per acre. It is applied to the soil in various ways; but the most common, and, I think, decidedly the best way, is to spread it, when slacked, over corn ground, after it is ploughed, and before preparing it for planting. It is also frequently put on ground with stable manure when preparing it for wheat, and some farmers spread it on sod. This I do not think an economical way, it being too much exposed to the action of the atmosphere. The quantity used varies from 30 to 100 bushels per acre, and I have known persons put on 200 bushels per acre; if the soil contains plenty of vegetable matter, or if plenty of stable manure is put on with it, this quantity will do no harm; but if the soil is deficient in vegetable matter, so large a quantity will destroy vegetation entirely for some years. If any regard is paid to economy, this is not the proper quantity. Lime being disposed to work down in the soil, the subsoil must be very close if it does not get below the reach of the roots of the plants before they can take it all up, if so large a quantity is put on at a time. On limestone, slate, or gravel, and clay loam, 100 bushels per acre, repeated every eight years, is the proper quantity; on red shale and sand, 50 bushels per acre, repeated every four years. It will take at least eight years to exhaust the soil of 100 bushels of lime per acre by our system of rotation in crops; and if the subsoil is of a porous nature, such as in red-shale soil, it will not retain it that long within reach of the roots of the plants.

Grasses.—The only kinds cultivated are timothy and red clover; 4 quarts of each sow per acre when sown together, and 6 quarts of timothy and 8 quarts of clover per acre when sown separate. Average yield per acre, 3 tons. Average price of hay: clover, $8 per ton; timothy, $10 per ton. There is now no ground kept expressly for meadows here; all must take its turn in the rotation of crops.

Very respectfully, yours, &c.,

DAVID MUMMA, Jr.

Hon. Thomas Ewbank,
Commissioner of Patents.

East Brandywine, Chester Co., Pennsylvania,
11*th month*, 24*th*, 1851.

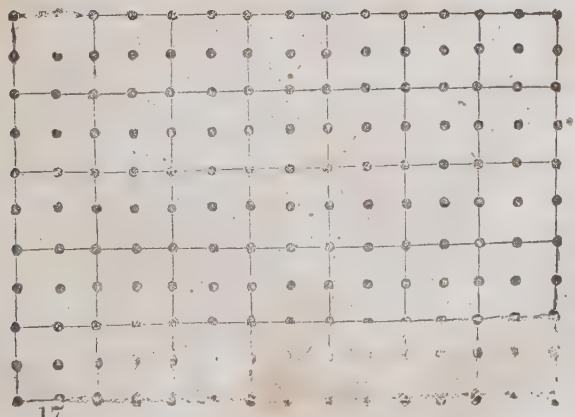
Sir: Having received a Circular from the Patent Office, containing important queries in relation to agriculture, and feeling, as I do, the most lively interest in those matters, I regret that my want of leisure will prevent me from making more than a few hasty remarks.

Wheat.—The present crop, for quantity and quality, has never been surpassed. I have heard of no failure in the State.

Corn.—This crop in our vicinity is very light; and I should judge, from reliable sources, that in that portion of the State east of the Susquehannah there will not be more than one-half of an ordinary crop, owing to the dryness of the summer.

Oats.—The oat crop, somewhat affected by drought, was attacked in many places, while ripening, by vast numbers of grasshoppers. In some cases they have destroyed half the crop. They have done great injury to the late pasture, and whatever came in their way. In walking over a field occupied by these hopping gentry, one feels astonishment at their unlimited numbers. "To count them all, demands a thousand tongues, a throat of brass, and adamantine lungs." Their appetites are scarcely less surprising than their numbers. I noticed none that appeared to have symptoms of dyspepsia. I have no doubt that every observing farmer has noticed the rapid increase of the insect tribes as the feathered races are gradually exterminated by gunners. One would suppose that the beauty and innocence of the latter would protect them from harm, independent of their invaluable services to man. Were the legislatures of the several States to enact heavy penalties against their destruction, they would, no doubt, confer a great favor on agriculture.

Labor-saving methods of Planting Corn.—For several years past, I have endeavored to discover some way to shun the ordinary tedious mode of furrowing off ground for corn, which, with us, consists in making, with the plough, a furrow each way of the field for each row of corn, in order to save the use of the hoe in cultivation. Failing to invent an implement capable of making two or more furrows, correctly, at once, I changed the direction of my pursuit, and was agreeably surprised in finding out the fact that we had been making twice as many furrows as were needed. Although this may appear paradoxical, I proceed to describe my improvement. Whatever distance apart I desire to plant, I mark out double the space each way of the field, thus: suppose I desire to plant four by four feet I furrow off eight by eight feet at right angles, and the field is then ready to plant. I then plant at the intersections, half way between the intersections, and in the centre of each square, the field over, as shown below, the lines representing the furrows, and the dots, the hills of corn:



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The unmarked rows, which run at right angles with the direction of planting, need the greatest care of any to keep them straight. One-fourth of the hills are planted on the surface of the ground, but no difference was perceivable in the growth of the corn. I have planted two crops in this way, and never had the rows more regular. It appears to possess other advantages besides saving half the labor of marking. The ground is less liable to wash by heavy rains prior to cultivation. It shuns about one half of the balks usually made by the plough in the old way. It causes no fatigue to the eye or the mind to divide the spaces in dropping. A person having the phrenological organs of *form* and *size* small might not be able to drop correctly. Of this I cannot say. I estimate it to be worth at least eighty cents per acre to furrow off ground for corn in the ordinary way. A farmer who adopts this plan will, in marking off ten acres, save about four dollars' worth of labor, or forty cents per acre. From the best means I have of judging, there are about nineteen millions of acres planted yearly in the United States; if the above mode were adopted, it would save seven millions six hundred thousand dollars' worth of labor annually. Some allowance should be made, however, for that which is planted with drills, &c. The writer feels desirous, through the kindness of the Commissioner, of presenting these hints to his brother farmers throughout the Union. Should it lighten in some degree their toil, or prevent the unnecessary wear of muscle, it will be a source of unfeigned pleasure to him. Under the impression that furrows are no advantage to the growth of corn, and not content with the above imperfect release from toil, I continued in pursuit of the object I had in view until I had attained (as I believe) the point desired, which was, to discover a means by which furrows could be rendered unnecessary. The instrument for this purpose is constructed on the principles of geometry; but its simplicity has, no doubt, enabled it to elude observation, as but few persons, on seeing it, could conjecture its design. It will require two boys, with a little instruction, at the beginning. It will need a straight line at the side of the field to start by, or it may begin in the middle of the field. It will require about one-fourth more time to drop the corn than the usual way. For all practical purposes it need not cost above $2. Should it possess the two essentials—novelty and utility—I would be much pleased to have a knowledge of it placed in the possession of every farmer in the United State. But justice to myself would seem to require that I should ask some little remuneration, as it will enable the farmer to drop corn with great regularity, (any desirable space either way,) and will save nearly double the amount of the former expedient. I feel diffident about offering any notions of my own; but, as the Circular seems to invite replies of this nature, I hope mine will not be found out of place. I have been much gratified in reading the last Report from the Patent Office, and I cannot conclude without expressing my admiration of those judicious recommendations to Congress in regard to the Office. I sincerely hope that honorable body may enact them all; I view the Patent Office as having been the nursing parent of so large a portion of these incomparable advantages which we possess over former generations.

The foregoing remarks are respectfully submitted.

MORDECAI LARKIN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

P. O. MONTROSE, SUSQUEHANNAH COUNTY, PA.,
November 19, 1851.

DEAR SIR: Some time since I received a Circular from your office, soliciting information in regard to the agricultural products of this (Susquehannah) county. I handed it to Mr. Thomas Nicholson, one of our best farmers; and herewith you have his reply.

With much respect, your obedient servant,

B. CASE, *Postmaster.*

THOMAS EWBANK, Esq.,
Commissioner of Patents.

The principal productions of Susquehannah are wheat, corn, oats, hay, butter, and cheese; together with neat cattle, sheep, and wool.

Wheat.—Till within a late period the principal part of the wheat raised in this county has been grown on new land; but as the land is mostly cleared, it is now grown on ploughed ground, but not in quantity for more than a home supply, as the soil is not of the nature suitable to a profitable production of this grain. Guano is not used, and summer fallows are generally relied on for a good crop with barn-yard manure. The average is about 8 bushels per acre, and the yield is rather increasing, owing to better cultivation. No regular system of rotation is pursued. We are not troubled with Hessian fly or weevil. The price will average about $1 per bushel.

Corn is a very important crop in this county, and gives a handsome remuneration to the farmer. The usual average is about 30 bushels per acre. No guano is used. The system of culture best adapted is to plant upon green sward, turned over in the fall, or early in the spring, with or without manure, as the land may require. Where the land has had a previous crop, it is ploughed and ridged before planting; plaster and ashes are applied to the hills.

Oats.—The average yield of oats is 30 bushels per acre; 2½ bushels seed per acre are used. Oats are considered an exhausting crop; but large quantities are grown, as there is a ready market, and the crop is sure.

Hay is the great crop of Susquehannah county, as it is peculiarly a grazing country. Timothy is the most approved grass, making incomparably the best hay; but, in seeding land, it is exceedingly beneficial to mix with clover. The average per acre is about one ton.

Potatoes.—In consequence of the rot, no more potatoes are grown than are necessary for the supply of the table; but formerly they were the main reliance for fattening hogs and feeding stock The quality in this district cannot be excelled.

Butter and Cheese.—Within a very few years the products of the dairy have greatly increased; so that upwards of 1,200,000 pounds of butter were made in the county last year, and the quality is equal to any in the United States. Cheese is not much attended to as yet, but the quantity is increasing. The time is not distant, and may be said to be at hand, when the dairies of this county will be highly celebrated. Average yearly products of butter per cow, about 80 pounds. In the larger

dairies the milk is churned, but on the small farms, the cream. Average price of butter 12½ cents per pound.

Neat Cattle.—Large numbers of young cattle are raised, and sold to the drovers, principally two and three years old, together with a fair amount of oxen; but no cattle are fattened for the city market. Oxen are much used for farm labor, and are broken in at two years old. Much attention is now paid to improve breeds for stock, and the show of Durhams and Devons at the late fair in Montrose was exceedingly creditable.

Sheep and Wool.—The hills of Susquehannah county are finely adapted to the growth of sheep and wool, the flavor of the mutton being peculiarly fine, and the wool, whether long or short, of excellent quality. Large flocks are not kept, but every farmer keeps a number for his own use, and has generally a surplus to part with. It only requires the business of wool-growing to be entered into intelligently to be made profitable.

Fruit.—Apples are the main productions in this line, and are receiving increased attention. The quality, when cultivated, is fine, and can be made highly profitable; but, hitherto, has been much neglected. The soil appears very conducive to the production of this fruit, which is now beginning to find a ready market by means of the communication to New York by the Erie railroad.

NEAR UNIONTOWN, FAYETTE COUNTY, PA.,
November, A. D. 1851.

SIR: Having received your Circular, dated United States Patent Office, Washington, August, A. D. 1851, in answer, I must say that there are many branches of agriculture inquired after that do not come under the notice of our accustomed agricultural pursuits.

Wheat is raised to a considerable extent in our county; a large portion of our land is well adapted to its culture, being a limestone or clay soil. For many years heretofore our cultivation has been bad, and the soil has become much reduced; but our lands abound with limestone and stone coal, and many farmers have seen the utility of applying lime to their lands, and have brought them into a good state of cultivation.

We generally apply about 200 bushels to the acre, and by the use of clover it does not want renewing for several years. The product of our soil is evidently on the increase in proportion to the advances made towards scientific cultivation.

Many are now receiving a fair remuneration for their labor—say from 10 to 25 bushels per acre, according to the quality of the land and manner of cultivation. But, taking the general average, I should suppose it would be from twelve to fifteen bushels the acre. The most several kinds of wheat we sow of late years are Mediterranean and Lammerman; they appear to be the most productive. The most usual time of sowing is from the 1st to the 20th of September. They stand the winter better than many other kinds, and are not so subject to the fly. The Mediterranean ripens about the first week in July; the Lammerman some days later. Either kind generally weighs from sixty-five pounds per bushel. Our wheat harvest was good this year. Market price per bushel from fifty-five to sixty cents. Counting

the interest on the price of our land, and all the other expenses attendant on raising a crop, our wheat costs us about fifty cents per bushel.

Corn is an important crop with us, and generally compensates the cultivator for his labor. It is generally fed to stock of different kinds. Some feed it whole, and others get it ground with the cob, which is certainly the most profitable way. I think that in ordinary seasons the general average crop is from thirty-five to forty bushels per acre. This year we have had a long drought, and the crop fell short fully one-third. We think from the 25th to the last of April is the best time for planting corn, as the ground is generally drier then than in the first week of May. Corn is worth 45 cents per bushel this fall. From calculation of all expenses attendant on raising a crop of corn, it costs us about 23 cents per bushel. Our corn is generally of the yellow kind; thought to be the best to feed stock. Take the best gourd-seed corn, and cultivate it for a few years, and the nature of our climate is such that it will merge into a mixture between the gourd-seed and yellow flint, which make a heavy and valuable corn.

Oats.—There have been large crops of oats raised in our county heretofore; but some are gradually reducing their cultivation, considering them more injurious to the soil than other grains.

Our common time of sowing is from the 20th of March to the 10th of April; they ripen then by the time the wheat harvest is through with. The most common yield is from thirty to thirty-five bushels per acre. Oats are now worth 25 cents per bushel. The entire expense of raising them ready for market is about 15 cents per bushel. The most general kind of oats raised in my neighborhood is the one-sided head, or Poland, which is considered to be the most productive.

Hay.—In ordinary seasons our meadows, on an average, cut from one ton and a quarter to one and a half per acre. Many, for want of natural meadows, mow their upland that is sown with timothy and clover; which is a valuable substitute. This year, owing to a long drought, our grass fell short nearly one-third.

Potatoes are not cultivated very largely in our county, being principally grown for family use. I have not heard much said of their suffering from the rot this season; but, owing to the drought, the potatoes were small, and consequently of but small yield. The sweet potato is cultivated for family use, and yields tolerably well.

Horses and Mules.—The principal part of our farming is done with horses; the mule and the ox do but a small part of the ploughing. Horses are the every-day drudge for man in our county, both for saddle and harness; and, consequently, the raising of them is considered profitable. The probable expense of raising a good colt until he s 3 years old would be from $40 to $50.

Sheep Husbandry has declined in our county to some degree; but, as I am not in that branch of business, I will leave it to those that are able to give a detailed account of it.

The breed of cattle has been much improved with us of late years. A number are paying particular attention to their improvement, to whom I must leave the honor of giving a practical account of it.

Our most accustomed method of farming is, if we have lime, to spread from 150 to 200 bushels to the acre on grass sod, plough it under, harrow it well, plant our corn in hills about 3½ feet each way. We gener-

ally try to leave not less than 2 or more than 3 stalks in a hill; sometimes, if the ground is strong, leave 4. Those that cultivate oats sow their stalk ground in oats in the spring, with about 2 bushels to the acre. After the oats are taken off, put out our barn and other manure, plough it under, and not stir it. Sow from 1½ to 2 bushels of wheat to the acre, broadcast. Some harrow both ways, and some only one way. Those that sow wheat or corn ground cut up the corn in the fore part of September, plough it well one way, and sow it broadcast, as above.

The wheat-drill has been introduced into our county, but has not been sufficiently tested yet to give a definite opinion. I have used what we call a slide on my wheat this fall, instead of a roller. We take a log as long as a common roller, split it in two, hew it straight, with one edge a little bevelled, put a tongue in the centre, and drag it, instead of its rolling. When we use this we only harrow one way, and pass the slide immediately after the harrow. My wheat came up well, and continues to look well; but when we come to harvest it, we will be better able to judge of its utility.

Very respectfully, your obedient servant,

SAMUEL WISCOM.

Hon. THOMAS EWBANK.

DELAWARE.

LEWES, SUSSEX COUNTY, DELAWARE,
January 15, 1852.

SIR: Your Circular of August last was received by me in September, asking information on agricultural subjects. I will give the practical experience I possess upon the culture of corn, wheat, barley, &c., and the use of guano as a fertilizer.

Corn.—In the first place, I plough my corn land 8 inches deep; sow guano, 300 pounds to the acre; and plough it in, 6 inches deep. I then lay off the rows 3½ feet each way, leaving 2 stalks to the hill, and till principally with the fluke harrow. My average crop in 1851 was 30 bushels per acre on 130 acres. In 1850 I broke up a few acres of wet, flat land, entirely unproductive; I spread 50 bushels of lime to the acre in 1849; in 1850, after ploughing, I sowed 200 pounds guano to the acre; ploughed it in, 6 inches deep; planted in corn, 3½ feet each way. It yielded 28 bushels to the acre. In 1851, applied 200 pounds guano to the acre; planted in the same way, and raised 40 bushels per acre. I intend the next spring to give the same land 300 pounds guano to the acre, and plant again in corn.

Wheat.—My wheat crop the last year was small, having sown very poor land, with a small portion of guano, (the price in 1850 being $60 per ton). I sowed the last fall about 70 acres in wheat; ploughed the ground 8 inches deep with the Prouty plough No. 5½; sowed 300 pounds guano to the acre, and ploughed as deep as I could with a three-furrowed plough; harrowed the ground, and drilled in the wheat, 1¼ bushel per acre.

Barley.—In 1850 and 1851 I sowed a small quantity of barley on poor corn land; put 200 pounds guano per acre, seeded 1¼ bushel per acre,

and raised 20 bushels per acre. I consider barley a very profitable crop—more so than wheat or oats; and I design, the coming spring, to substitute barley in lieu of oats.

Guano.—I have used guano for several years past in different ways and quantities, and, judging from past experiments, I believe 300 pounds per acre, ploughed in 6 inches deep, is the most profitable way it can be used.

The farmers in this section are using lime, slacked at the kilns before being brought here. It probably pays better than guano, taking 10 years together. We get it from New York at 6¼ cents, and from Schuylkill at 8 cents per bushel. Guano has a most powerful effect on the poor lands here, and our farmers, although slow in their improvements, are beginning to see that farming is but a poor business without the use of lime and guano. The poor lands here will, in most cases, yield 10 bushels of corn for every 100 pounds of guano.

Very respectfully, yours,

S. P. HOUSTON.

Hon. THOMAS EWBANK,
Commissioner of Patents.

NEAR SEAFORD, SUSSEX COUNTY, DELAWARE,
December 3, 1851.

SIR: The county of Sussex, in which I reside, has an extremely level surface and sandy soil, interspersed with extensive swamps and numerous ponds, which, in past years, have tended to make the climate very sickly; but our farmers having lately adopted the plan of ditching their lands, the climate has become comparatively healthy, and land which had been rendered almost useless for the want of this improvement now exhibits a wonderful degree of natural productiveness, yielding in some instances from 50 to 75 bushels of corn per acre, without the aid of manure. I regret to say, however, that in a considerable portion of the county there has been, and there still is, a great deal of bad farming; and so great is the desire of the owner of land to make it pay for itself by the lumber which can be cut on it to supply a city market, that he neglects the improvement of his land altogether. Land soon becomes waste and worthless by such means. I am happy in having this opportunity to state that in this immediate section the method of improving the soil has been for a few years undergoing a great change for the better, and is still increasing in interest and energy. The manuring of land was formerly deemed a matter of small importance, but now it is considered *the* indispensable requisite to good farming. Old causeway gutters, ditch banks, fence rows, and muck holes, instead of being left to breed disease, are cleaned out, and their contents turned into compost to improve the soil.

Our purchased manures consist of lime, ashes, guano, bone-dust, and poudrette. The quantity which is usually brought to our little village, (Seaford,) and used in this vicinity, I have no means of ascertaining precisely, but, from the best calculation in my power, I would say that from 60,000 to 80,000 bushels of lime at 7 to 8 cents per bushel, and from 40,000 to 60,000 bushels of ashes at 12 cents, are delivered here

annually, and 80 to 140 tons of guano, besides bone-dust and poudrette—the quantity unknown.

Corn is the chief staple of this county; but the land, when improved for the production of other grains, is found capable of making a satisfactory return for labor bestowed.

There are many varieties of corn in our crops, since but little care is taken to select the pure grain for seed, and the different species have an extreme natural tendency to mix when planted indiscriminately. Yellow corn was formerly preferred, but white corn has recently commanded the best prices, and consequently this is now the favorite with us.

It is not considered well for a person to speak much of his own transactions; but, as a planter can speak more understandingly of his own mode of cultivation than of that of another, I presume that I may be excused. My plan is to run the plough 5 to 7 inches deep through a clover sod about the 1st of March; follow this with the drag-harrow in the same direction; then strike off a two-furrowed list from 3 to 4 inches deep, and about 4 feet apart, from centre to centre; cross the list by single furrows, the same distance apart; drop 4 or 5 grains in a hill, and, as soon as the corn is sufficiently high, thin out to 2 or 3 stalks in each hill; apply the cultivator twice in a row each way, then the plough 4 times; and, lastly, the fluke-harrow twice; which finishes the tilling. When the corn is hard, I top and strip it, stock the fodder when cured, gather the corn in the month of October, and then cut, haul, and rick the stalks for provender and manure.

The Wheat Crop of this year is an average one. There are many varieties; but the blue stem, white, and Mediterranean are the favorites with us; the former being thought to be better adapted to our soil than any other; the latter being of earlier growth, and more able to withstand the fly and the rust. My mode of culture is to plough from the middle to the last of August, then use the drag-harrow, and commence seeding about the latter part of September, and finish about the middle of October. Sow broadcast from 1 to $1\frac{1}{4}$ bushel per acre, plough it in 3 inches deep, and then run the roller over it, in the same direction as the plough. Begin to harvest about the 1st of July, or sooner; reap with the ordinary scythe and cradle; bind and stack, and secure as soon as practicable. An average crop on improved land is from 15 to 20 bushels to the acre.

Oats are thought to have a tendency to impoverish the land, and therefore are not much attended to.

Barley.—None raised in the county to my knowledge.

Rye, Peas, and Beans but little raised.

Grasses have not generally been sown until a few years past; but now this enterprise is deemed a matter of considerable interest and importance. Clover is the principal grass sown here; I sow it on my wheat ground immediately after ploughing and before rolling.

Fruit is needlessly neglected in this county, for the land is particularly adapted to the culture of almost all kinds of fruit, more especially the apple and peach. These would thrive here and live to an old age.

I think the grape also would do well, for there is on my land a native vine of one foot diameter.

But this subject, we may hope, is attracting more attention, since more fruit has been shipped from the county this year than in any previous

year. As my time is sufficiently employed for other purposes, I raise fruit merely for domestic use.

The subject of *manure* has already been attended to. Allow me to say something more:

I commence in the latter part of the fall to haul pine-shatters, woods-dirt, and the contents of fence-rows and muck-holes, and other substances of the kind, and spread them over my pounds one load deep; feed my stock upon them with coarse provender until the 1st of May; haul in as before, and cover the pounds one load deep; pen the stock during the night only in the pasturing season; and about the 1st of August dig and turn over the manure in the pounds. Besides this, my horses and oxen are housed in stalls 7 by 10 feet, the like substances being put into the stalls as into the pounds, and they cleared out every two or three weeks to give place to more. About the 1st of November the manure thus accumulated is hauled into the field intended for corn, composted, and left there until the following spring, when it is spread over the field and then ploughed in. By this method I get manure enough to cover the whole of my corn-field, (some 50 acres.) A portion of my hogs also are kept up all the year, and supply manure sufficient to cover from five to six acres.

Of lime, I use from 40 to 50 bushels per acre, during the summer or fall, on ground intended for corn the next season.

Ashes are applied in like quantities, and a top-dressing of corn or wheat ground.

I have used guano to some extent, both for corn and wheat, at the rate of 200 pounds (Peruvian) and 300 pounds (Patagonian) to the acre, and have derived considerable advantage, but not so much as other farmers have, according to their statements. I am of the opinion that the article is entirely too high for the profit which it yields.

My experience in farming is limited to the short period of five years; but in that time I have been able, by the method which is herein detailed to you, to make quite an improved farm out of a very poor one. I purchased the land (300 acres) in 1845 for $1,200, and rented it out in 1846; for which I received, as one-third of the products, *three* bushels of wheat, about fifty bushels of corn, and fodder in proportion.

I have since that time lived on the premises myself; divided it into four fields of 50 acres each, instead of two as before; and have gathered an increased crop every year until the present, when it amounts to 950 bushels of wheat, 2,111 bushels of corn, and an abundance of potatoes and other vegetables.

In order to increase the interest in the public mind on the subject of farming in this section of the county, we have established a club, consisting of 12 farmers, who meet together once a month, at the residence of each member by rotation; eat a good dinner; walk over the fields, and talk freely and socially together in regard to the *modus operandi* which each has adopted.

Hoping that this communication may meet your wants, I am yours, with due consideration,

CHAS. WRIGHT.

P. S.—The average price of wheat is 70 to 90 cents; of corn, 50 to 63 cents. The range of thermometer from 10° to 50° in winter; in sum-

mer 80° to 93°. My neighbor, Governor Ross, has informed me, since writing the above, that he has raised more than 1,300 bushels of sugar beet on 1½ acre of his land.

C W.

MARYLAND.

NEAR JERUSALEM MILLS, HARFORD COUNTY, MD.,
December 26, 1851.

SIR: In replying to the Agricultural Circular, which you did me the honor to address me a short time since, I will observe that want of time will prevent the response to the queries contained in it from being as full and explicit as I would wish. I will take them up, however, *seriatim*, and reply to those which relate to subjects with which I may be familiar. It may not be amiss to state that my observations extend more particularly to that portion of our county contained in the peninsula formed by the waters of Bush and Gunpowder rivers.

Wheat.—Guano is used to a great extent on the wheat crop, and on our thin soil increases the crop, in most instances, at least two-fold when about 300 pounds per annum is applied. The average product of wheat is about 15 bushels. The yield is increasing, and has been since our farmers commenced the use of lime, guano, plaster, and other fertilizers.

The seeding time with us commences about the 1st of September, and lasts until the ground is frozen. Harvest commences the latter part of June, and generally is ended by the middle of July. The number of times the land is ploughed for the wheat crop depends upon the fact whether it be an oat stubble or a clover lay. If the former, we generally plough twice—once immediately after harvest, and again a short time previous to sowing; which effectually destroy the oats that had vegetated from the seed scattered out in harvesting. If a clover lay, we plough but once; and in both cases generally roll and harrow the ground, to reduce it to as fine a tilth as practicable before sowing the seed; which, when sown broadcast, is harrowed twice—once with the lands, then across.

However, our farmers are beginning to appreciate the great advantage resulting from drill husbandry, and are supplying themselves with the proper implements for drilling in their crops, wheat included. The system of rotation in crops, which has generally prevailed with us for some time, and originally derived from Chester county, Pennsylvania, is, first, the land is ploughed for corn, and limed on the furrow; the next spring the land is ploughed and sown in oats; and after the oats, the ground is prepared for wheat the next fall, upon which the stable manure which has collected during the year is applied; and, if not in quantity sufficient for all the land to be sown in wheat, guano, or ground bones, or some other fertilizer, is called upon to make up the deficiency. Grass seeds are sown upon the wheat either the same fall or early in the ensuing spring. The land then remains in grass until again broken up for corn.

We know of no *sure* remedy against the Hessian fly. The weevil we are not much troubled with.

The average price of wheat during the present year has been about 90 cents; it would be safe to say 85 cents.

Corn.—Guano is also used on our corn-crop, but not to the same extent as to wheat. It is applied, generally, to the land previous to its being flushed. Some time after planting the land, it is sown upon the furrow, and then harrowed in either way. It adds materially to the gain of the crop, increasing it, I should think—when 300 pounds per acre are used—at least two-fold. Guano appears to act as well upon the corn crop as upon the wheat, and our farmers are commencing to use it more extensively upon their corn. The average product is about 30 bushels, but it is increasing.

I presume the cost of production, from the time the seed is planted until the corn is in the bag, to be at least 15 cents a bushel, independent of the cost of any manure that may be applied. I prefer, for feeding horses, that the corn should be ground with two or three parts of oats; for cows, that it should be ground alone, without bolting; and in both cases, mixed, when fed, with cut hay. I have had no experience in cooking food for stock of any description. The bran of corn makes an excellent feed for milch-cows; and farmers, when they send their corn to mill to be ground for meal, should always send another bag for the bran, besides the one sent for the meal.

I cannot state from direct experiment the amount of grain the manure formed from ten bushels of corn, consumed by hogs, will add to one acre if carefully saved and applied at or before the time of planting; but I think I am safe in asserting that, if a pen of hogs are supplied with proper material, and in a properly constructed pen, the quantity of manure made by them, from the time they are penned up till killed, will, if carefully saved and properly applied, cause such an increase of the crop that the gain will nearly, if not quite, amount to the quantity of grain consumed while confined; in other words, pigs will pay for their board, or, rather, can be made to do it.

Oats, Barley, Rye, Peas, and Beans.—The average yield of oats may be set down at about 20 bushels. They are generally sown after the corn-crop, and without manure—this being reserved for wheat, which is to follow, as above stated.

Barley is but little sown, since farmers who apply stable manure, or guano, to their corn-crop follow the latter with a crop of barley, under the impression that it is not as subject to lodge as oats, on land recently manured. As stated before, it is, however, rarely grown.

Rye, of late years, has been but little attended to, owing to the fact of its almost entirely failing to produce a crop worth saving, the cause of which has never been satisfactorily accounted for. Fifteen or twenty years ago, it was considered, in this vicinity, as profitable a crop as wheat, or any other grain.

Peas are cultivated on a small scale; also beans, but seldom in field culture.

The pea has never, to my knowledge, been cultivated in the neighborhood as a renovating crop—clover succeeding so well. We consider, of the last-named products, viz: oats, barley, rye, peas, and beans, that a crop of oats is the most exhausting to the land.

Clover and Grasses.—The average quantity of hay cut to the acre I presume to be about one ton—perhaps one and a half.

The best fertilizers are, (presuming the land to have been already limed,) composts of stable manure with earth, plaster, and bone-dust. I deem the bone to be a most valuable ingredient in a compost for fertilizing a meadow or pasture. For meadows, timothy is preferred to all other grasses. About a peck of seed is sown to an acre. The cost of growing hay, if merely estimated from the time of cutting until safely stowed in mow or stack, I suppose, would be about $2 per ton. To this should be added, however, the cost of setting in grass, interest on land, &c., which, of course, vary according to the difference in soil, locality, &c.

Dairy Husbandry is not much attended to with us, although it is greatly on the increase—the example being set by several families of the Society of Friends residing in this part of the county, who devote considerable attention to this branch of husbandry, and whose labors in it command the highest remuneration in the Baltimore market, as their butter always brings the highest price, owing to the quality of the article, as well as their character for neatness and cleanliness, for which those who prepare it are so justly proverbial. We also have a few enterprising farmers from the North, who are turning their attention to the butter-making, and earning for it an enviable reputation. No cheese made, save it be in small quantities, for home use.

Neat Cattle.—The raising of cattle is increasing with the improvement of our lands, and most of the improved breeds are being introduced. Many of our farmers, as they enlarge and improve their pastures, buy, in the fall, stock cattle, which they keep during the winter in their yards, feeding them on hay and other fodder; and in the spring, as soon as the grass is fit, turn them on their pastures; and during the summer, or early autumn, turn them over to the butcher. It is generally expected that the steer thus treated will sell for at least as much again as the first cost.

Horses and Mules.—For some years past the high prices which horses have commanded with us has made their raising profitable, and considerable regard is paid to the rearing of them. The expense of rearing a colt until 3 years old should not exceed $80. With us, it is generally thought best that the brood mare, during pregnancy, should be worked moderately, and fed with a liberal allowance of generous food; and the same while suckling the colt. For about a month or two after dropping the foal, it would be well, if the services of the mare can be dispensed with, to let her rest from labor. During this time, the best place for the dam and foal, if the season permits, is the pasture. When the mare is taken up for work, then they should be both placed in a roomy stable, where it is best the colt should remain while the dam is at work. One thing is essential—that is, the colt should never be allowed to suck until the mare is cooled, provided the weather and work are such as to produce an unusual degree of heat in her system. After weaning, the colt should have good pasture to run in, if summer, or good hay and occasional feeds of grain, if winter, with a shed, or hovel, to protect in case of storm. In about 2 years, commence to break; avoid temper, use firmness with gentleness, and do not overtask. From the time of weaning

until you commence to break to actual service, it is well to accustom the colt to be felt and handled as much as possible, as it will greatly facilitate the breaking. Mules are but little used, except by some manufacturing establishments of cotton and iron, and they are purchased from droves coming from the West.

Sheep and Wool.—We raise but few sheep, owing to the ravages committed on them by the worthless curs with which we are infested. That sheep-husbandry is eminently profitable, or, rather, would be, for the whole of Maryland, is beyond doubt or cavil; but until our legislature provides a proper and efficient remedy for the great nuisance created by the hordes of prowling, half-famished dogs which are to be found in all our agricultural districts, the farmers of the State will be deterred from availing themselves of one of the greatest sources of agricultural wealth.

With great respect, very truly, yours,

JOHN CARROLL WALSH.

Hon. THOMAS EWBANK,
Commissioner of Patents.

WOODLANDS, MONTGOMERY COUNTY, MD.,
December 7, 1851.

SIR: About a month since I had the pleasure of receiving the Agricutural Report from your Office for 1849-'50, under the frank of our estimable representative, Mr. Bowie; and by yesterday's mail your Circular, dated August, 1851, reached me, also under his frank.

Wheat.—The cultivation of this valuable grain is greatly on the increase in this part of Maryland. The crop of this year in Montgomery county will greatly exceed that of any former year, and is, I am confident, as great in amount as the whole raised in any five consecutive years for the last forty prior to the introduction or use of guano; measurably owing to the extensive use made of that fertilizer, and partly owing to the favorable season, as well as to a greater breadth of land sown. The average product is, I think, about fifteen bushels per acre; though as low as twelve, and as high as twenty, bushels are not rare; even thirty-five bushels in several instances, I have heard of from persons that could be relied on. The quantity of guano generally used per acre is about two hundred pounds, but I believe two hundred and fifty or three hundred pounds would be more advantageous on thin land. I have found, from small experiments, that the increase in straw as well as grain was about in proportion to the quantity of guano sown, to the extent of four hundred pounds to the acre; beyond that, I am inclined to believe that there would be an increase of straw, but a diminution of wheat. My usual time of sowing is about the first of October, or as soon after as practicable, and, as I observed in a former communication, thereby escaping the ravages of the fly. The depth of ploughing is determined by circumstances. When an *old field*, (and there are yet too many such in our county,) covered only with hen-sedge, and almost destitute of humus or vegetable matter, is to be fallowed, (preparatory to a crop of

wheat,) this should be done (not later than August) to the depth of about five inches, stirred or crossed either with the harrow or double shovel to the depth of three or four inches; in September, guano and wheat sown simultaneously, and turned in with the double shovel in October; and during the succeeding winter, or as early in the spring as the frost will permit, sown with clover seed. I have heard of another method of treating such land, represented as succeeding well, viz: first sowing a heavy quantity of guano, and turning it under seven or eight inches before seeding the wheat. But not knowing anything of it experimentally, I will confine myself to the mode pursued by myself as above; after which, alternating annually with wheat and clover, as described in my communication, page 128 of your Report, 1849–'50.

Ploughing.—In the course I have pursued, I have depended much upon the fertilizing constituents appertaining to clover, and, at the same time was actuated by a desire to improve the greatest extent of land, with the least expenditure of cash (in procuring guano.) And, in turning under each successive crop of that valuable grass, the depth of the furrows was increased an inch or two; thus, when two crops have been turned under, the average has reached eight inches, and in some of the valleys extended to ten and twelve. How much deeper it may be found advantageous to plough, remains to be proved! But I believe that, where clover and other fertilizing substances are turned under, just as deep as is ploughed, so deep will be the soil, and no deeper; and, therefore, the greater the depth, the greater the fertility, and the greater the probability of an increased crop. The best depth to be obtained must be determined by the nature of the land, and the strength of a man's team. In stony land, or through hard-pan, it would be difficult to penetrate to a great depth. *Very* deep ploughing, however, will not improve land in all cases, but should be regulated by the quantity of manure or fertilizing substances to be ploughed under. A gentleman, who moved into my neighborhood a number of years since, conceived the idea that he could render his land at once productive by simply ploughing it *deep;* put four powerful horses to his plough, and turned it up to the depth of twelve inches; the result was a total failure! And, after experimenting with it for a year or two, he endeavored to correct his mistake by turning it back again to the same depth, but in vain; the trifle of fertility that the surface possessed previous to the experiment had been buried too deep, and became incorporated with so large a mass of sterile clay as to render it inoperative. Neither will it, from my experience, answer to cross or stir the land, fallowed for wheat, more than from three to four inches; but let *that* be thoroughly done. I once almost entirely failed in making a crop by cross-ploughing a field as deep as it had been fallowed, and stirring it until it was as light as it could well be made before sowing it down in wheat. The winter's frost or something else destroyed it, and, instead of obtaining from fifteen to twenty bushels per acre, which it was capable of producing, I reaped but little more than I had sown. This, to me, was doubly mortifying, as a portion of it was sown with beautiful white flint wheat, procured from western New York, at an expense of three dollars a bushel by the time it reached me.

In preparing a different description of *old field* for wheat, I have pur-

sued a different process: one covered, or thickly set, with broom-sedge—the botanical name of which I do not know, but have no doubt it will be at once recognised by most of the citizens of a great part of Maryland and Virginia, as well as some other States—and resembling in its appearance the natural grass I have seen (more than twenty years ago) on the prairies of Illinois and Missouri. Knowing that it increases the chances of making a good crop of wheat, if the land is previously cleansed from all noxious vegetable matter and rendered friable, I have, by means of a strong team of horses or oxen, ploughed such land, from one to three inches below the roots of the sedge, as early in the fall, or during the winter months, as possible, covering the sedge under by attaching a heavy chain in front of the mould-board; and in April harrowing, first lengthwise with the furrows, and cross-harrowing; then, checking off with the plough, planted it in corn; dropping, in every check with the corn, a handful of plaster and ashes mixed, or a handful of guano to two checks; and in others a shovelful of domestic poudrette, covering the whole with loose dirt, scraped and drawn over with hoes. (The poudrette was manufactured by hauling alluvial or rich dirt, and mixing it in the proportion of three or four to one of human ordure, taken from the privies, which I have found both quick and powerful in its effects.) The corn, during its growth, tended by frequent stirrings of the surface, so as not to disturb the sedge, with small harrows and double shovels. During the fall, winter, or early the following spring, ploughed again, when some of the tufts of the sedge-roots will be found troublesome, but the sedge itself tolerably well decomposed; (and I believe, if plaster or lime had been strewn over it before the first ploughing, would be completely so;) after which, well harrowed, and sown with five pecks of oats, and from one to one hundred and fifty pounds of guano to the acre, and both turned under with the double shovel—the stubble of the oats fallowed and treated with guano and wheat, in the manner before described. By this process, I have produced moderate, but remunerating crops of both oats and corn for the labor bestowed, the quantity of each determined pretty much by the amount of rain that had fallen during the period of their growth, (for it is a fact, that the action of guano, without the aid of moisture, is greatly diminished,) and effected a good preparation for wheat, and for a more permanent improvement of my land. Some of my neighbors have used the drill, for putting in their wheat, with great success; which induced me to get and use one of "Pearson's," (Delaware,) last fall, with which I put in from eighty to ninety acres, at the rate of one bushel and a peck to the acre. The wheat has come up with great regularity, and looks strong and vigorous. This implement, I am inclined to believe, will be found very advantageous to all who will take the necessary precaution to prepare their land properly for its use, as it places the seed at a proper depth and distance with unmistakable accuracy, and requires so much less seed to the acre than the old method of sowing broadcast. I have dwelt much longer on the subject of ploughing than I had intended, because I view it as the *foundation* of success in agricultural pursuits; and "in giving in my experience," my remarks may be treated with derision by the fortunate occupiers of rich, alluvial, or calcareous soils; yet by others, (like myself,) who have (or may have) to *make* a soil from exhausted land be-

fore it becomes productive—impoverished heretofore by the cultivation of tobacco, or other exhausting crops—by those, possibly, they will be more favorably received.

Condition and prospects of Montgomery county.—The system pursued by the early settlers in Montgomery was destructive to the soil and injurious to her best interests—cutting down and clearing as much land during winter as they could plant in tobacco—each emulous to exceed his neighbor in the *amount* he could produce—and continuing to plant it in that weed for a year or two, until it would produce tobacco no longer; and then wheat, corn, and oats until *they* were no longer profitable; after which, thrown out, they soon became *old fields;* their only change, whilst one piece of land was in a course of exhaustion, was to attack a fresh piece, and treat it in the same manner. Such a system, pursued for a succession of years, would impoverish any land where nothing was returned to sustain it; and such, unfortunately, was the case here throughout a great portion of the country; and "Poor Old Montgomery" became a familiar term to designate the desolation, from which many of the inhabitants fled for refuge to the fertile lands of the West, rather than "face the enemy," and, possibly, your correspondent from Indiana among them. (Page 455 of your Report for 1849–'50.) To this condition of things (40 years ago) he evidently points, where he tauntingly assigns it as one probable reason for the failure to grow "cheat" I mentioned in a communication to your predecessor. And, as he appears to apprehend that *that* communication may have an evil tendency, I will so far endeavor to prevent it by saying that, since then, I have repeated the experiment, and *did* succeed in growing it. Nevertheless, the thing called chess or cheat is still to me a mystery, for I have noticed many fields, where only clean wheat had been sown, after being injured by the fly, produce from a fourth to a third of cheat; and also, near turning rows, where horses or other animals had passed and nipped off the top, tufts of cheat were to be found—all of which, to me, had the appearance of an abortive effort of the plant to produce genuine wheat. Be this as it may, there is now but little danger of cheat being sown with wheat, since the introduction of the improved fan, which separates this as well as all extraneous matter that differs in size from the grains of wheat. Pardon this digression into which I have been led in order to notice the communication above alluded to, headed "Wheat *vs.* Cheat." But now, what a great and glorious change has been effected by the sons of those Montgomerians, and others, who remained and battled with the "enemy," (before alluded to;) and instead of the unsightly sedge, everywhere, in extensive "spots," in their season, verdant fields of wheat are to be found, promising a rich reward for the energy and industry exerted in conquering and reclaiming them from their former impoverished condition. The day is not distant when Montgomery will become (if it is not at present) one of the most desirable localities in the State—possessing land, as it does, almost any of which is susceptible of the highest improvement by the application of fertilizers at hand in Baltimore and the cities of the District. Already emigration, instead of from, is setting into the county. And let them come, provided they bring with them the necessary qualifications and means of improvement; there is ample room for them in the yet unreclaimed portions of the county, which are to be had at a low figure—inviting such as may wish to change their location to come and partici-

pate in the enjoyment of as healthy a country as can be found from Maine to Texas—five to six hundred feet above tide, rolling and interspersed with beautiful little valleys that still retain a good deal of fertility, derived from the surface soil of the adjacent hills, washed into them by the rains, when formerly under cultivation, and abounding in delightful springs of water, of unsurpassable purity: surely, such inducements are worthy the attention of emigrants who are about to locate themselves, and to pursue agriculture as a vocation; particularly when combined with the advantages of a market for their surplus in Washington and Georgetown; where "creature comforts" can be had in great abundance, and at moderate prices, within distances varying from 5 to (nearly) 35 miles from them; in the midst of an intelligent, hospitable, and respectable population; convenient to churches of various denominations, mills, and a considerable number of mechanics of various descriptions. All that are required to insure success are a sufficiency of capital to commence operations with, a judicious application of that capital, and an indomitable spirit of persevering industry; and, with the blessing of Providence, there will be no such thing as fail. As a proof of which, I will briefly state that there is a small settlement of Germans about 3 miles from me, who a few years since (with little or nothing beyond their physical abilities to aid them) seated themselves down on a poor, miserable looking old field, and have, by their industry, and means obtained by working round amongst their neighbors, effected a change that is really surprising and pleasing to behold; and who will, I have no doubt, become wealthy, provided they remain prudent, as they have hitherto been industrious.

It may be objected to this communication, that I have not confined myself strictly to the inquiries contained in your Circular, or to agricultural statistics; but I trust that, when it is known that not only this, but other counties in Maryland, and likewise in Virginia, are similarly situated, and present a picture corresponding pretty much with the one I have endeavored to portray, it will, I hope, be conceded by every lover of his country that my observations will not be misplaced in your forthcoming Agricultural Report, where they will have a wide circulation, as I think the object I have in view must be apparent to all—a desire to attract, and if possible intercept and *fix*, that description of emigrants who will be most likely to renovate and improve those portions of our county that remain unreclaimed; and, by so doing, improve their own condition, increase the valuable productions of the country, and thereby promote the public weal. To the refined, intelligent, and wealthy citizen, desirous of exchanging his more sedentary for an active, rural life, this county, I think, likewise presents peculiar inducements. Removed from panics, occasioned by fluctuations in trade and monetary affairs, he can here not only invest, but employ his capital profitably, and at the same time find pleasant employment and recreation in the improvement and embellishment of his property; obtain the choicest delicacies from tide within a procurable distance; mix with congenial society in many parts of the county; and, by way of relaxation, attend the debates in Congress, when in session: but, over and above all, his chances for the enjoyment of good health (without which all other sublunary blessings he may possess are insipid) cannot be surpassed from "Dan to Beersheba," or in any portion of our blessed Union; and long may that Union be perpetuated and remain a blessing to us and to all future generations.

In conclusion, I will only remark, that all the valuable kinds of grain and grasses congenial to this climate can be grown here, by the aid of guano and other fertilizers, to as great perfection as can reasonably be desired; and, by a judicious system pursued in the application of them, and the addition of lime, the lands can be rendered, I think, permanently productive.

Very respectfully, your most obedient,

F. C. CLOPPER.

Hon. THOMAS EWBANK,
Commissioner of Patents.

VIRGINIA.

FAIRFAX, VIRGINIA, *February* 20, 1852.

SIR: In complying with the request for a communication from Fairfax, I would state that, in appearance, the county is so changed in many parts that a traveller who passed over it 10 years ago would not now recognise it.

Thousands on thousands of acres, which had been cultivated in tobacco by the former proprietors, would not pay the cost, and were abandoned as worthless, and became covered with a wilderness of pines. These lands have been purchased by northern emigrants, the large tracts divided and subdivided, and cleared of the pines; and neat farm-houses and barns, with smiling fields of grain and grass, in the season, salute the delighted gaze of the beholder.

Ten years since, it was a mooted question, whether Fairfax lands could be made productive, and if so, would they pay the cost? This problem has been satisfactorily solved by many; and in consequence of the above altered state of things, school-houses and churches have doubled in number.

I think, after an experience of 11 years, that the best mode of cultivation is what we term the three and two-crop system, viz: corn, oats or potatoes, wheat, or potatoes and wheat; always seeding down the wheat to lay in grass two or more years, according to circumstances, and keeping as much land in grass as possible; and, if near the Alexandria, Washington, or Georgetown markets, to keep a dairy and cut hay, as butter and hay pay a better profit than grain or stock.

Potatoes are also becoming an important crop. Although we cannot grow them quite equal in quality, or as many in quantity, as at the North, yet no crop pays so well at present.

When I first came to Virginia, but few persons would purchase potatoes grown here; all preferring those grown at the North, and depending on the North for their supplies. But the introduction of the mercers, and possibly some improvement in the culture, have improved the quality of the potatoes grown here; which, together with the loss sustained by many by the rotting of the northern potatoes, makes ours now a ready sale. The rot has not, thus far, seriously affected us here, though some cases have occurred.

As the greater part of our land was, and is yet, very poor, *manure* is all important.

Guano, though costly, is so quick and certain on all crops, that it stands No. 1. Although I am satisfied that plaster does good, I have never seen its effects except on land I had previously limed with 50 bushels shell lime per acre. And here the effects are so visible that I am induced to use both. I have also used soap-boilers' ashes with very good effect; yet, after all, my chief dependence is the barn-yard, which I clear out twice a year—in the spring for potatoes and corn, and in the fall for wheat.

Horses, as a whole, are of a medium quality, and there are but few bred in the county.

Cattle.—The great majority are natives, small in size, and without any particular quality to recommend them; yet we have some excellent cows, and with care in the selection, a good yard for a dairy may be obtained. We have, also, several herds of Devons, which are the favorites of all the improved breeds, and I think deservedly so for Fairfax. That they do not deteriorate, is proved by Mr. Lewis Baily, he having been a successful competitor with them for 7 years at the Maryland State Agricultural Fair, held in Baltimore. There are many fine working cattle in the county, but mostly imported.

Sheep.—Comparatively few kept. There have been a considerable number of fine-woolled sheep brought on from New York and Vermont; but from some cause or other, do not seem to get into favor.

Messrs. S. T. Stuart and Jacob Haight have excellent flocks of long-woolled sheep, and have had pens at our agricultural fairs which have been much admired, and would compare favorably at any agricultural show.

The fear of dogs prevents many from keeping sheep; and, until some law is enacted on the subject, the hazard will be more than the difference of profit between them and cattle.

Swine.—A very great improvement is observable within the past 10 years by importations from the North of various breeds; and our hogs may now be called a medium quality.

The above is respectfully submitted.

Truly yours, &c.,

THOMAS CRUX.

To the COMMISSIONER OF PATENTS.

TAPPAHANNOCK P. O., ESSEX CO., VIRGINIA,
November 15, 1851.

SIR: Your Circular of August last has been received by me from the postmaster of the town of Tappahannock, with a request that I would furnish the information desired by it.

Wheat.—Guano is used in the production of this crop; the quantity applied per acre, about 200 pounds; the yield, from 10 to 15 bushels per acre, and that on the poorest lands—lands which, otherwise, would hardly produce as much as the seed required to seed them. The quantity seeded per acre, about one bushel, on corn land, at which time the guano is applied broadcast, and both turned under by a one-horse plough about three inches deep. The depth for the guano is one more of convenience

than choice, wishing to keep the corn-beds single, and not to ridge them too high. To reverse the beds would require the corn stubble to be ploughed up. Some plough in the guano with a double-horse plough, and then harrow in the wheat; but there is some difference of opinion as to the better way of the two.

The guano is passed through a sieve before it is used, to clear it of lumps; after which the lumps are beaten fine. A common hand-sieve was used, but it was found slow, and very disagreeable to the person using it; and I sent to Baltimore and got a piece of wire, two feet in length, and about 20 inches in width, with meshes three-eighths of an inch, and made a frame for it, with handles like a lime-sieve, and nailed it to the bottom of the frame. Two pieces of plank, five feet long, and four inches wide, will do for the side pieces for the box and handles, through which a quantity can be run in a short time, without much trouble or inconvenience to the person using it. Some carry the guano to the field, and there sprinkle it. The better way is, when not too lumpy, to sprinkle it before sifting, and to let it remain a day or two in bulk; or, to run through the sieve in the morning what will be wanting for the succeeding day, and then to sprinkle it and return it to the bags; either way will give sufficient time for it to become uniformly damp throughout the mass. This year I have used seven tons of guano with my wheat, seeded on corn land. The *white flint*, *blue stem*, and the *early purple straw* are the kinds mostly cultivated. For some years I cultivated the *red chaff;* after which, for many years, the *late purple straw*. Wishing to exchange the *late purple straw* for some other kind, I was at a loss, from the conflicting opinions of others. I therefore made a small frame, a foot square, and drew cords across it two inches apart each way, and planted a grain of wheat at each intersection, of one kind, then moved the frame on, and, in like manner, planted another kind, until I had planted all the kinds intended; this was done on some half a dozen different places in the field, then in wheat, and continued in like manner, for three years in succession. Four kinds of wheat were tried: the *white flint*, *red chaff*, *Mediterranean*, *and late purple straw*. The result was, the *late purple straw* made the least, the *Mediterranean* next, the *white flint* and *red chaff* the most, and about the same in quantity, and were more uniform in their annual product; since which, I have cultivated the *white flint*, and, on the same field, made about one-fourth more than I made of the *late purple straw*. The soil on which the experiments were made was neither light nor stiff, but an intermediate one.

Corn is planted in rows from five to five and a half feet wide one way, and from two and a half to three feet the other; single stalks, on beds formed by throwing six furrows together with a two-horse plough, cutting about five inches deep. When the corn is up and large enough to work, a furrow is run on each side of the corn by a single-horse plough, and the dirt thrown from it. It is then hoed, after which, there is not much uniformity in its cultivation—some preferring one way, and some another; and various agricultural implements are then used to suit different views. Guano is not used in the production of this crop; the cost prevents it. It is regarded as more profitable to apply to the production of wheat.

Peas.—Many varieties are cultivated—the black-eye; the clay cow-pea; a light yellow; and a dark-red pea, also called a cow-pea. There are three

varieties which may be considered the best. It therefore may not be amiss to make some remarks respecting them: The black eye is raised for family use and for market; very productive; the leaf and vine small, compared to the other two, and therefore it is not so good to sow as an improver of the soil. The other two have large leaves and vines, and continue to grow until late in the season. The clay cow-pea is a beautiful looking pea, and if damaged, from its light color can be easily seen. The dark-red is just the reverse. In quality, the yellow is supposed much the best, and is said to be preferred by man and beast to the red; neither, however, appears to me to be fit for table use. Peas are seeded in spring, about a bushel to the acre, broadcast on fallow land, or land that was in corn the previous year, and turned under about the time of seeding wheat in the fall, and the wheat then seeded upon them and harrowed in. This has been attended with great success here, as well as elsewhere. Some seed peas among the growing corn when they give it the last working with a hoe, to turn them under for wheat; and it is said this has also been attended with like success; but I doubt its profitableness. In early life, impressions were made upon my mind that peas could not be profitably raised among growing corn; in consequence of which I have never raised peas among growing corn on high land but for family use, and confined their further cultivation for market and stock, to swamps, where the corn is usually injured or destroyed by the worm. But of late years I have been induced to make some experiments on a limited scale by sowing them broadcast amongst the growing corn when given the last working, which is immediately after the wheat harvest. The experiments have proved perfect failures, mostly owing to dry weather. This year I determined to try another experiment. I gave a piece of corn on ordinary land its last working the day before I commenced my wheat harvest, sowing so many rows broadcast, then leaving so many unseeded. The peas soon came up and began to grow, and the corn began to fade, and never regained its color, and did not make more than half as much as the unseeded row. The unseeded rows may give a better wheat crop than the seeded ones; but how far one crop should be sacrificed for another, presents many things for consideration. Crops of small value may be sacrificed for crops of more value; but the corn crop is one of great value, and cannot well be sacrificed for another more uncertain, like that of wheat, without the risk of loss. Had the peas been seeded after harvest, instead of before, it is reasonable to suppose the injury would have been in proportion, though not as perceptible to the eye. It is not here as it is in the South, where there is more length of season There the corn can even mature, and be severed from the land, and the land then seeded in peas, and heavy crops be produced; but here, in latitude near 38° N., where peas are seeded amongst growing corn, it may be said the corn and peas live and die together, struggling for their proportion of food during their existence, to the injury of both. Nor can so many late peas be easily saved by the ordinary force upon a farm, as to sow a large portion of the farm, and the corn-field also, at the rate of one bushel per acre; for late peas ripen during September and October, at one of the most sickly seasons of the year, when the hands are busily engaged in saving fodder and seeding wheat.

Horses and Mules are generally raised, but not quite enough to supply the demand, and the deficiency is mostly made up from those raised in

the West, and brought here and sold; but the horses reared here are better formed, more durable, freer from defects and bad qualities. The Western horses are too often defective in sight or limb, and their qualities no better; if one can pull down a fence, another can run away with a carriage. Were we about to sell a portion of our horses, we should not like to sell the best and keep the worst for our own use; and when we consider the distance they have to come, and the numerous trades to be made on the way, it is probable they reach here with as few defects and bad qualities as could reasonably be expected.

Cattle.—The breed of cattle are mostly of the native stock; but many have been crossed more or less with the fine imported breeds. I have had some experience with Durham and Devon cattle, and their crosses upon the native stock; and that at a more early day than the present. Mr. Coke, of England, sent to Messrs. Patterson and Caton, of Baltimore, some Devon cattle in 1817; and in 1825 I purchased a pair of calves of Mr. Caton at $250. I crossed them upon my cattle of the native breed. The cross, I thought, was superior to either breed. In 1828 I purchased of Colonel J. H. Powell, of Philadelphia, a Durham short-horn male calf, at $300, and crossed upon my cattle of the native breed. The cross was larger and finer than the Devon cross; but whether they were larger and finer in proportion to the food consumed I do not know. My stock of cattle, from that time to the present, has been mostly half-Durham and half-native. Devons are said to make the finest work oxen in England. I think they would make as good here as any other breed. I worked half-Devon and half-native oxen for more than ten years; along with them, the most of the time, half-Durham and half-native oxen worked. The cartmen were of opinion that the half-Devon oxen were much the best. In early life I became partial to hornless cattle, and, having some, increased their number by a hornless male; but in crossing these with Devon and Durham, too many horns were thrown out. To obviate this I had to cut out the horns of the calves when about an inch long, and connected to the skull only by a gristly substance, and to sear the place; after which some of them would throw out horns two or three inches long, which would generally turn downwards; but after there was turned out a hornless half-Durham male, the descendents of the hornless cows were then hornless. Horns add nothing to the strength of the ox for the yoke, nor to the milking propensities of the cow. Cattle are as easy to halter by the neck as by the horns; and, should an unruly one break loose, none can be gored. Hornless cattle stand together under a shelter like a flock of sheep; and when fed, the weak and strong feed together, the weaker not much fearing the stronger. I have frequently seen the stronger attempt to make the weaker get out of the way by giving them a few slight butts on the side; and, being unable so to do, put their heads under the weaker, so as to shove them out of the way. In agricultural publications we frequently meet with cuts of the improved breeds of cattle of Great Britain; amongst the number is the Galloway, a polled or hornless breed, of Scotland. Were I to judge from the cuts that I have seen, and the character given this breed, I should think it well deserving a trial here. From the cuts, I should suppose the Galloway one of the best formed and one of the most beautiful breeds of Great Britain. The breed is represented smaller than the Devon, generally black or brindle; the male "clothed in a loose and mellow, though

rather thick skin, covered with long, soft, and glossy hair." "In roundness of frame and fullness of ribs the Galloway cattle may, perhaps, vie with even the most improved breeds." "They are a hardy race, subsisting on the coarsest pasture, and increasing rapidly when removed to a more favorable situation; they fatten finely on the best parts; their flesh is of the finest quality; and the joints, being of a moderate size, more suitable for consumption in private families than those of the larger breeds; they usually command the highest prices at Smithfield." They are represented not as good milkers as some of the larger breeds; but on coarse and scanty pastures they might give more in proportion to their size and the quantity of food consumed. My impression is that this breed of cattle has never been tried in Maryland or Virginia, so great has been the rage for large cattle, *without regard to pasture.* No cattle in Great Britain could have been imported into the United States at less expense; for Galloway, that portion of Scotland from which this breed takes its name, is the most southern part of Scotland lying on the western shore, with several fine seaport towns, not more than 100 miles north of Liverpool, to which they could have been shipped on any day to Liverpool, at a cost only of $1 or $2 per head. For cuts of the improved breeds of cattle of Great Britain, and their character, see, as well as other publications, the Farmer's Register, vol. 2, p. 199, published at Petersburg, Virginia; from which we have made some extracts.

To break Oxen.—I do not know that I can tell the best way, but I can tell a better way than many practise. Take them in the spring, when about two years old, at the time the manure is to be carried out, put a rope around the neck the day before they are to be yoked, and lead them to and fro for 15 or 20 minutes. This will alarm them at first, and cause them to make great exertions; but they will soon know what confinement is. Next morning yoke them, and put them between two old yoke, and let them work a few days; they will never forget it. Afterwards they can be occasionally worked, as necessity requires. This is a better way than to suffer them to get large and strong, and then to have to put a long rope around their horns or neck, and to have them prancing over the farm, with some half a dozen hands after them with sticks and clubs.

Sheep.—The native breed is most common, but many of them have been crossed by the imported breeds. The native breed is hardy, makes good mutton, and, in proportion to weight of carcass, yields as much wool as the large imported breeds—and that on coarse and scanty pastures. Large sheep appear better suited for market and luxuriant pastures; but here the three-field system is the most common. Under this system the native breed appears more at home. My system is the four-field. This gives more and better pasture. I therefore crossed my breed of sheep a number of years past with the Bakewell; since which I have raised no other than this cross. The wool is of the *very best quality* for family use—better than the Merino or South Down, or their crosses upon the native breed; all which I have tried.

Fruits.—More attention has been paid to raising fine fruits of late years than at any other former period. I have tried a good many varieties of apples, pears, peaches, cherries, apricots, and grapes, and expended much money in that way, as well as time and labor in their cultivation. But it is my intention, on the present occasion, only to notice a few va-

rieties of each kind, nearly all of which have borne with me, or they are expected to bear in one or two years; and, as far as I have been able to judge, they have, with few exceptions, well maintained the high character given them in other parts of the United States.

Apples.—White Juneating, early harvest, summer pearmain, yellow bellflower, and cart-house—none of the fine winter apples of the North—seem to succeed here well. A valuable work on fruit trees was published by William Coxe, of Burlington, N. J., in 1817, with descriptions of several hundred varieties of fruits, and with cuts of two hundred varieties. This work induced me to get from the North some trees of the fruit varieties recommended by him. The apples, when they came to bear, were mostly found not to answer, and the trees had to be grafted over; to the Newtown pippin was grafted the cart-house, a winter apple recommended by Coxe, and supposed to be a native of this State. The tree is hardy, of vigorous growth, and one of the most beautiful and productive; but in maturing its fruit, like all our fine winter apples, it rots too much, often leaving but a small portion to put up for winter use; but when put up, it keeps better through the winter than any other fine apple. It is supposed to be one of the most profitable apples cultivated on the Chesapeake and its tributaries. I see, also, from the Patent Office Report of 1849–'50, p. 437, that it is said to be "one of the most profitable market varieties from one end of the Mississippi to the other." The *wine-sop* has not been named by me before, because in quality it is only second rate; but, notwithstanding, its cultivation is much on the increase. The tree is hardy and very productive; the apples hang uncommonly late, and seldom ever rot; but it will not keep like the cart-house—it is only an early winter apple. Coxe on Fruit says: "The flesh is rich, yellow, and tolerably juicy, pleasant and sweet; the cider produced from it is vinous, clear, and strong—equal to any fruit liquor of our country for bottling." The English red-streak and the famous old "non-such" have long been extensively cultivated in the tide-water region; the non such under the name of the queen or cathead.

Pears.—Osband's summer, Julienne, Bartlett, (Williams's bon Chrétien,) Flemish beauty, Louise Bonne de Jersey, Beurré Diel, Beurré d'Aremberg and winter Nelis, Madeleine, white doyenné, (the butter pear of Pennsylvania and Virginia,) and the Seckel, in quality are equal to those named before them; but the Madeleine and white doyenné are old varieties, and the trees subject to the blight. I raised several trees of these two varieties, and, after bearing a few years, they were all killed by the blight; they are said to do better West than on the Atlantic coast. The Seckel is considered by many the finest pear known. I have two trees of this variety in my garden, now twenty-odd years old, and the blight has not injured them in the least; but it is a tree of slow growth, and the pears ripen slowly on the tree—from 4 to 6 weeks; during which time storms and high winds beat down great numbers of them. The product at times, though great, leaves the quantity to be consumed but small. In naming some first rate pears, I named, amongst the number, the Bartlett, Louise Bonne de Jersey, and Beurré Diel. These run through the whole period of ripening of the Seckel and white doyenné, and, I think, should be preferred. The trees are of vigorous growth, bear at an early age, are very productive, and the fruit is large and of the finest quality. I have grafted these three varieties to the water sprouts of old

pear trees, and in two or three years have eaten the pears from the grafts in a high state of perfection. The Bartlett, in its growth, is rather ornamental than otherwise, and can be planted in the garden if desired. The Diel is a beautiful spreading tree, with large deep-green leaves, and can be grafted to old worthless pear trees, scattered over the farm for stock to repose under; all three varieties can be gathered about the time of ripening, or picked up as they fall, and will ripen as well in the house as on the trees.

Peaches.—Early York, Morris's red rare-ripe, yellow rare-ripe, red cheek Melicaton, Oldmixon cling-stone, Oldmixon free-stone, Crawford's late free-stone, Ward's late free-stone, Heath's free-stone, and Heath's cling-stone. I have had a great number of varieties under cultivation, both native and foreign, but have named only a few varieties, such as will no doubt give general satisfaction.

Cherries.—Virginia May, (the early Kentish of some, early white-heart of others,) Elton, black Tartarian, Downton, black eagle, yellow Spanish, and Downer's late. The black Tartarian and yellow Spanish have long been considered two of the best cherries at the North. Therefore a few remarks as to them may not be amiss: I have a tree of each kind, large and flourishing, set out by myself near 30 years ago. The black Tartarian is very productive, the fruit very large and of the finest quality, its duration short, and, not unfrequently, the last of the cherries have a worm in each. The fruit of the yellow Spanish is very large, and much admired for its beauty and excellence; but it rots sooner than any cherry that I have had under cultivation.

Apricots.—I have tried a good many varieties, but the Moorpark is the largest and finest that I have ever seen. It can be known from others by a perforation through the stone from the point where the stem attaches itself to the stone. There is a groove running along the back of the stone; at the end of the groove is the perforation, through which a pin or needle can be passed lengthwise for about one-third the distance of the length of the stone. Cole, of Boston, on Fruit Trees, gives the perforation of the stone to the peach apricot. All other writers that I have seen give it to the Moorpark.

Grapes.—Catawba, Isabella, Warren, (Herbemont's Madeira.) I have cultivated a great many varieties, both native and foreign. The Catawba and Isabella I have had under cultivation ever since their first introduction to public notice. The Catawba is one of the most certain to mature its fruit well; the Isabella and Warren rot very much at times. For want of space I have not even referred to the character of some of the fruits named.

Lime and Marl.—Shell marl is found in great abundance in some portions of the tide-water region. In some neighborhoods there is more than enough to supply the wants of the neighborhood, and in others none; and, as it will not bear the cost of transportation far, its use is mostly confined to the neighborhood in which it is found; in consequence of which only a few, comparatively, can avail themselves of its advantages. Lime is used here with the same results as elsewhere. Whilst some of the experiments prove highly satisfactory, others appear the reverse; but, notwithstanding, the use of lime is much on the increase. I have this year myself limed over 100 acres. The cost of lime at the landings on the Rappahannock is from 7 to 8 cents per bushel.

The Three-field System.—This system is the most common; the rotation, corn, wheat, and pasture. Lime and guano, under this system, may give greater crops for a time; but it is much to be feared that it will be attended with a future loss, for there can be but little or no general improvement of the soil under this system—so says the whole face of the country of the tide-water region, where it has been long, fully, and fairly tried. More fields than three seem to be required, so as to give a greater rotation of crops; and amongst the number should be clover and peas. Under a proper system, much could be accomplished in a short time in the improvement of the soil in the tide-water region, owing to the many facilities for obtaining the means. But the salt marshes and swamp lands immediately in connexion with the marshes on the Chesapeake and its tributaries cannot be reclaimed in this State, nor Maryland, as they are north and south of the Chesapeake, owing to the little elevation and depression of the tides. The vertical height of the tides along the Atlantic coast, from Charleston, S. C., to New York, may be estimated at from 5 to 6 feet; on the Chesapeake, and its tributaries, not more than about half as much, not giving a fall sufficient for drainage.

EDMUND F. NOEL.

Hon. THOMAS EWBANK,
Commissioner of Patents.

NICHOLAS C. H., VA., *November*, 1851.

SIR: In your Circular, you have propounded sundry questions, to which you desire answers; among others the adaptation of the lands to grass, the annual yield, cost of cultivation; also yield and staple of wool, and the probable cost of production. The greater part of the lands in this county are in the hands of a few individuals, who are disposed to sell only large surveys. The price ranges from $1 to $3 per acre, according to locality. As natural grass lands, they are unsurpassed in the world; the red-top or herdsgrass putting up spontaneously so soon as the under-growth, which is generally very sparse, is "hacked" out, and the larger timber deadened. This is done for about $2 per acre. The yield of hay upon such land is generally 2 tons per acre; the usual price to mowers, 75 cents per day; which is the only expense. Lands so improved are worth about $10 per acre. Heretofore the inhabitants have paid more attention to guano than stock; but a radical change is taking place. More attention is being paid to stock; the population is rapidly increasing, and in a few years this will be the choicest stock-farming county in the State, and perhaps the wealthiest, especially if a more liberal spirit should "creep" into the halls of our legislature. The Central railroad will run through or near the county, and the Baltimore and Parkersburg railroad but a couple of days' travel off. A turnpike is likely to be constructed from the county seat, via Hunterville, in Pocahontas, to Warm Springs, which will turn the tide of travel through the county passing through the very finest grazing lands in the State. No section in the world can surpass this for sheep and wool-raising. But little, if any, attention has been paid to improvement by judicious crossing. Our native sheep are usually healthy, subject to few, if any,

diseases, and attain fine sizes. The yield of wool is from 3 to 5 pounds per head. The cost of wintering to the farmer does not exceed 25 cents per head. The increase greatly more than pays the keep, leaving the wool clear. The staple is much larger and finer than is usual to our native breeds, and seldom injured by burrs. To capitalists and others who might wish to turn their attention to stock-rearing—especially sheep—no section holds out such inducements as Nicholas county, Virginia.

Respectfully,

HENRY M. PRICE, M. D.

N. B.—Not only can the staple be raised, but likewise manufactured; the streams affording water power to turn the machinery of the world. The land abounds in cannel, anthracite, and bituminous coal, iron, and fine granite for building purposes. Indeed the day must come when this section must manufacture for the entire Mississippi valley.

WHITEHALL, NEAR BROWNSBURG, ROCKBRIDGE, CO., VA.,
January 31, 1851.

SIR: Having been slightly indisposed for several days, I have devoted the time to looking over your Report of 1850, kindly forwarded by the Hon. A. H. H. Stuart, Secretary of the Interior, and Hon. John Letcher, M. C.—two gentlemen of sterling integrity, and of whom we feel justly proud in our district.

Your Report presents much varied and valuable information from Maine to Oregon. I have been much interested in reading many of the letters; and your volumes will be carefully preserved for future reference.

I read with interest the report of Edmund Ruffin, giving an account of his harvest operations for the years 1846 and 1848. I do not think it any improvement upon the course generally pursued in the valley of Virginia; and I will endeavor briefly to state our plan of operations during the harvest month. I will suppose a good farm to have 15 laborers: 6 of the best take the cradles; 6 others with light rakes, with long handles and 4 to 6 teeth, follow, raking and binding the wheat, which, when heavy, is tied in large sheaves, with double band; 2 small hands gather the sheaves, and usually an old trusty hand puts up the shocks; 10 sheaves being set up, and 2 put on the top, called hudders.

Thus everything is closed up as fast as the grain is cut down. It is important that the wheat be well shocked, as it often stands out several weeks before being housed. But generally the first cut wheat may, within a few days after the harvest is over, be housed. If the force is not so large, then make half shocks the first round, bringing the wheat up to the edge of the standing grain; then 7 hands will perform the work, as the man who shocks the wheat can also gather the sheaves, and the row of shocks is always completed the second round. A good cradler will cut down 100 dozen per day, which, with an ordinary bind, will make 50 bushels of wheat, and, when the bind is larger, will make a fourth more if the wheat is well filled.

Wheat cut in the dough state makes the fairest flour; and if it can be got dry enough to grind in August, it will make a beautiful family flour,

and will keep well the year round. I have, however, found it more apt to heat when put in bulk, than if left to get ripe. After wheat has once gone through a sweat, there is no danger of its heating, unless attacked by the weevil, when it invariably heats; and if it is not immediately ground out, loss ensues. When barns become infested with weevil, it is better to rick out the wheat, thresh it, and put it away in the chaff in pens, the bottom a foot above the ground; the bottom and sides lined with straw, and well covered. It can be cleaned up as ground; and in a few years the barns will be free from weevil.

Our county seat, Lexington, (at which place are located Washington College and the Virginia Military Institute,) is termed by some the Athens of Virginia. It is certainly a beautiful place, has much literary talent, and can boast of many of the refinements of polished life. The mass of the population of Rockbridge will compare favorably with that of any county in the Old Dominion; and, taking our valley from Roanoke to Jefferson, there are few sections of the United States, of the same extent, that can boast of a better country. Vast herds of the finest beeves are driven to the Richmond, Baltimore, and Philadelphia markets. Our milk and butter are equal to any in the world. Our lands produce every variety of grass and grain. Our pork and mutton are ample for all our wants. With a surplus for our eastern friends, almost every variety of vegetables is cultivated. Apples, peaches, apricots, nectarines, pears, strawberries, raspberries, gooseberries, and currants are abundant wherever cultivated with attention. Our mineral wealth is inexhaustible. In fine, there is hardly any good thing that may not be had in this valley with industry and good economy. None need want who have good health, for with reasonable industry all may provide the comforts of life.

Our valley is also making rapid strides in internal improvements; our Central railroad from Richmond taps the valley at Rockfish gap, passes by way of Staunton, and is heading out to Covington, butting, as it were, against the Iron mountains.

The James River canal is opened to Buchanan. The Lynchburg and Tennessee Railroad is progressing rapidly to its western terminus. We are a prosperous—we ought to be a happy people.

This valley will compare favorably with any part of the United States with which I am conversant in point of morals and religion. We are mainly a law-loving and a law-abiding people. Every little community has its church. The ministry are generally men of a high order of talent, particularly the Presbyterian, Episcopalian, Methodist, and Baptist. The churches are generally well filled every Sabbath by a people who voluntarily contribute from $200 to $1,000 annually for the pastors' support.

We have many good schools, and even the German population, who have heretofore done little in educating their sons and daughters, begin to take an interest in these matters.

I must say something of our *servants* in the valley. They are generally a robust, healthy, sleek, well-fed, well-clad, and well-housed people, (I speak of farm hands and house servants.) It is the interest of every master to take good care of his servants; to see that they are not unnecessarily exposed to bad weather; to work them moderately and treat them kindly: in this way they are less liable to disease, more attached

to home, and not given to pilfering, and generally become much attached to the family. In a well-ordered farm there is rarely a necessity for correction. Where method is pursued, you rarely find servants out of place. In winter, breakfast should be early, dinner at noon, and supper at night. In the harvest month, when labor is severe and days long, a slight repast between 4 and 5 P. M. greatly strengthens the hands; and I believe this custom prevails extensively in the valley.

It is a good custom to give the hands presents occasionally—say at Christmas and harvest time—or to allow them to cultivate an acre or two of corn, which the master can buy, or give permission to sell elsewhere. Servants well-treated rarely ever run off; but there are bad servants, as well as bad children, and when they need correction it ought always to be promptly attended to. In making this statement with regard to our servants in the valley, it is intended to apply to our well-ordered farms, where the proprietors generally superintend their own hands. There are exceptions to the general rule, and you will find in all communities hard masters, whether they are served by black or white laborers. Some there are who drive early and late. Mammon is their god. To heap up gold, and gloat over their treasures, appear to be all they enjoy in this life; they are of little service to Church or State. They would like to see the country improved, yet they never give one dollar to that end. They like good roads, provided you will make them through their neighbors' lands. Or if, perchance, you must force a road through their premises, the damage asked is five times greater than the injury sustained. They are mere drones, too penurious to live well themselves. You may here expect to see ill-fed and ill-clad, ashey, dirty, looking servants. I feel happy to say these are but the exceptions. The large mass of our valley landed proprietors treat their servants well; they are infinitely better off than the free negroes amongst us; indeed I will go farther, and say they are much better off than many of the poor white families that are found in every community. They never want for the substantials of life; indeed in very many families they live as their masters live, and work no harder. When sick, medical aid is afforded, and generally they are well nursed.

To give you some idea of the general health of our county, I would remark that since I have lived in the country, (my present residence,) 15 years, my physician's bills have averaged about one dollar per annum. My family have ranged from 15 to 20. Present family 20; 5 whites and 15 servants. No medical aid for the last 3 or 4 years. Our meals rarely vary 15 minutes from the appointed time. We usually retire from 9 to 10, and rise from 5 to 6 the year round. We enjoy a good deal of social intercourse with our immediate neighbors; attend the post office almost every day, and the church every Sabbath, when health and the weather permit.

HENRY B. JONES.

Hon. THOMAS EWBANK,
Commissioner of Patents.

WHITEHALL, ROCKBRIDGE, CO., VIRGINIA,
November 20, 1851.

SIR: In answer to your Circular, I submit the following:

Wheat.—Guano is not extensively used in the valley of Virginia, from the fact that it is too expensive. The cost in Richmond is from $46 to $50 per ton, of 2,000 pounds; cost of transportation over a distance of 120 or 150 miles, from $10 to $15. I am using it in a small way this year, at the rate of 150 to 200 pounds per acre, tried in different ways, and will, if living, report the result next year. The article has been but little used in my neighborhood, but, in every experiment, with decided success. The yield has been thought to be equal to a gain of 5 bushels of wheat per acre, where 150 pounds were sown. This, at the present low price of wheat, will not pay here; wheat being now worth only 50 cents per bushel at home, and at Scottsville, our nearest market, about 70 cents. Guano, costing $3 per hundred, would show a loss of 50 cents per acre. The best preparation for wheat is believed to be a clover-lay, ploughed down in June, the clover turned under to a depth varying from 5 to 9 inches. Our best farmers are those who uniformly plough deep. Two or three good stout horses are generally used; 2 are most common. With the Livingston plough, and 2 good horses, the earth is turned over from 6 to 8 inches in depth; this is again turned about the first of September, and immediately sown at the rate of 1½ bushel per acre. If the soil is very good, 2 bushels of seed are sown. With our best farmers, the yield is 20 bushels per acre, or 10 to every 1 sown. I do not think the average of our county would be over 8 bushels per acre; for it must be remembered that a large portion of our farmers put in their crops badly, from the fact that many farm too much land, and, as a consequence, it is badly tilled. A few of our best farmers have made as much as 42 bushels per acre on choice lots of 10 acres. This should teach us the necessity of paying more attention to collecting manures, and properly applying them. From my experience in farming, I am of opinion that every little hand could be profitably employed in saving and making manure; and on large farms, a force could be set apart for this express purpose. With regard to rotation of crops, there is much diversity of opinion, and scarcely any three persons pursue the same rotation. The five-shift system prevails to some extent, 3 years grain and 2 years grass, and in some cases 3 years grass and 2 grain—say corn, oats, wheat, and grass 2 years.

Most farmers sow their wheat without any preparation. When smut prevails to any extent, I have found that soaking my seed wheat in strong brine, and rolling it in lime, answer a valuable purpose; and I never have smut with wheat thus treated. There is, however, some danger in this process if the fall is very dry; as the wheat is apt to sprout, and, with long-continued dry weather, when slightly covered, is apt to perish. This fall, being dry, I simply soaked in strong brine and rolled in ashes. Wheat I mixed in the morning was covered by noon: mixed at noon what would do till night. My wheat came up well and now looks promising. The yield per acre is on the increase, and farming is generally improving.

Corn.—Guano is but little used on corn in this part of the valley. With regard to the corn crop this year, it is a poor one—I think I may say a half crop. Good farms readily produce an average of 50 bushels

per acre; some few go higher figures, but many fall below 30 bushels. This is one of our most valuable crops. We do not, however, always use it to the best advantage, as it is generally fed on the cob. In this way, I am of opinion, it makes the finest and best pork; but it is certainly not the best economy.

A good clover-lay, or sod, is the best for corn; which should be turned over as deep as possible, thoroughly harrowed, and, if the land be rolling, should be laid off as near on a level as practicable, 4 or 4½ feet apart, and drilled to stand, one stalk in a place, 9 inches apart. The sod should not be disturbed; but the crop should be kept clean with the cultivator and hoes. I have never failed to make a good crop of corn when thus cultivated.

Clover and Grasses.—Clover is very extensively in use in the valley of Virginia, and is considered one of the best fertilizers. The seed is usually sown on wheat or rye during any of the winter months, and on oats in March or April. The quantity of seed sown is generally 1 bushel to 8 acres; but of late years, I have sown thicker—say 1 bushel to 6 acres. One gallon per acre would be ample if all the seed would vegetate and grow; but it is better, when seed can be had for $4 50 or $5 per bushel. to put it on pretty heavy, than have a partial failure. When thick, it makes the best hay, as the fibres are not so large. The yield on good land is, in good seasons, fully 2 tons per acre. The same remarks will hold good respecting *timothy*. Of the latter grass, less seed per acre will do; one bushel of seed will sow 10 acres.* Light sandy lands will produce good timothy, but not heavy crops. Timothy seed generally succeeds best when sown early in the fall on rye—say from the 20th August to the 1st of September. It is, indeed, now common with many farmers to sow wheat in August, particularly the Mediterranean wheat, which, if sown early, makes good fall pasture for calves. Timothy and blue-grass make the best permanent pastures, and are not so liable to the action of the frost. Clover is often frozen out, in severe winters, when not protected by snow.

Rye.—This crop is not extensively grown with us, and it is principally used for horse-feed, ground, and mixed with corn and oats. The long straw is cut, and makes an excellent feed. The multicole, or Poland rye, is becoming common, and frequently yields 40 bushels per acre—a half bushel to three-fourths sown per acre, from the middle of August to the first of September; but will produce well if sown later. This rye also makes excellent fall and winter pasturage for calves and sheep. The multicole, or Poland rye, was introduced through our minister to France, Hon. W. C. Rives; and was first grown in this State by Wm. Massie, esq., of Nelson county, whose crop, some years ago, averaged about 45 bushels per acre. It has a beautiful bright straw, from four to six feet high; and, notwithstanding the straw is rather soft, it usually stands up well. The seed was first sold at $4 per bushel, but can now be had for 50 cents.

Oats.—These are generally grown, being an excellent grain for feeding horses, mixed with rye or corn, or cut in the sheaf, and mixed with rye and cornmeal. The product is from 15 to 50 bushels per acre;

[* It is an error to suppose that a bushel of timothy will seed sufficiently ten acres of ground. If sown on five acres, it would be thin enough, even if a peck of clover seed is added.]

owing to the soil and preparation for the crop. Thin lands are more generally sown, as the crop is liable to failure on our best lands. They are considered to be an exhausting crop, leaving the land too light. Clover does not always succeed well with oats, particularly if the oat-crop is good. They shade the ground too much; and, when taken off, the hot suns of July and August not unfrequently kill the young and tender clover. The price for several years past has been from 30 to 33½ cents per bushel; are now worth from 30 to 40 cents. Barley, peas, and beans are not much cultivated in our county. The valley of Virginia abounds in fine cattle. I will, however, leave this query in the hands of more experienced cattle-graziers. Fine butter is made, but there are few farmers who give their entire attention to dairy husbandry. Our surplus butter finds at Richmond a ready market at a price varying from 15 to 25 cents per pound, according to quality. The little cheese that is made, finds a home market at 10 cents per pound.

Horses.—The supply about equal to the demand. Very fine, though rough bred horses are raised in our county. They are mostly stout and strong; fitted for the plough and wagon; are easily broken, and generally taken in hand when two years old. At this age they are much more easily broken, and should be carefully and gently handled, and put to light work. When thoroughly broken and gentle, they may be turned out, and only worked occasionally until four years old, when they can be put to regular work. The price of horses varies from $65 to $120; a large, strong, well broken horse usually commands $100. Mules are not much raised, or much used, except about our iron-works, where they are found to answer better than horses; will stand harsher treatment and rougher fare. They are mostly brought here from Kentucky. Price about the same as horses.

Hogs.—The Irish graziers and mixed Berkshires are our common stock. The latter come to maturity sooner than the former. The cheapest method of producing pork is a problem I have not yet solved. The farmer is rarely paid for it when sold under $5 per hundred. This year it will command $6, and perhaps more. My plan of raising hogs is never to keep over one winter. My usual average is 175 to 200 pounds. I calculate on 100 pounds after my hogs are put up to fatten, which is generally done in September. A hog, to be profitable, should always be kept growing, and never suffered to become lean. With nice keeping, hogs may be made to weigh 150 pounds from March 1st to December. I usually feed a little corn, with vegetables and slops, through the winter. I get my hogs on clover as early as possible in summer. So soon as the fruit begins to drop, let them have access to the orchard; and about the 1st of September put them up to fatten, giving them fallen fruit, with corn cut up with slop, once a day, closing with corn in November and December. My bacon is uniformly good and firm, producing fine lard and sweet hams. I usually make three killings in November and December, taking the fattest in order. Salt down at the rate of one bushel to 800 pounds of pork. If the weather is warm, I leave my meat in from seven to ten days; if cold, it may lie several weeks. During fifteen years I have not lost a piece of bacon. I salt from 3,000 to 6,000 pounds annually.

Potatoes.—The Irish potato does well with us. I have been but little troubled with rot; usually plant good-sized potatoes, cut and rolled

in lime, and planted on ashes; crop varies from 100 to 300 bushels per acre. Price, this year, 50 cents per bushel; but often falls to 25 cents. The sweet potato is but little cultivated in the valley, and generally from the slip. They are mostly small, and not well flavored.

The farmers of our county are beginning to pay more attention to fruit. Select varieties are introduced, and in a few years the article will be extensively sent to market. I planted a good orchard, fifteen years since, of some 500 trees, from the nursery of James Sinton, esq., near Richmond, Virginia. There is in my orchard much good fruit, and I rarely fail in raising enough for family use the year round. I cultivate the different varieties of pippin, the Baldwin, Swaar, Rhode Island greening, lady-apple, seek-no-further, bell-flower, and different varieties of russets, pears, peaches, nectarines, and apricots—all of which do well. I plant peach-trees every year, and, as many die, other trees succeed them. In this way the stock is kept up, and I rarely fail of having some peaches. I have no remedy for the yellows. Where the cattle tramp about the roots of the peach trees they generally last longer.

Yours, respectfully,

HENRY B. JONES.

Hon. Thomas Ewbank.

P. S —I have kept a diary for the last fifteen years, and have the range of the thermometer at daylight. I send you a table for the months of March, June, and November, for the last three years:

	Table for March.			*Table for June.*		
	1849. (Deg.)	1850. (Deg.)	1851. (Deg.)	1849. (Deg.)	1850. (Deg.)	1851. (Deg.)
1	30	49	30	60	50	58
2	32	34	30	62	54	59
3	33	42	32	60	46	60
4	29	28	30	56	50	56
5	30	26	28	63	*	60
6	31	42	50	66	*	61
7	36	41	34	64	*	70
8	38	42	28	66	*	60
9	38	34	30	62	*	66
10	38	38	35	61	*	53
11	36	30	30	57	*	60
12	40	34	36	56	*	66
13	48	43	35	56	*	60
14	54	55	40	60	*	52
15	44	45	50	62	*	48
16	48	45	55	66	*	55
17	37	46	48	56	66	52
18	50	45	42	60	70	46
19	29	43	34	58	63	44
20	40	29	32	60	65	52
21	55	32	36	62	66	55

* From home from 4th to 17th; the weather fine and clear, with a good rain on the 16th. Fine growing weather.

Table for March.

	1849. (Deg.)	1850. (Deg.)	1851. (Deg.)
22	34	36	35
23	32	40	36
24	38	32	40
25	52	27	40
26	34	31	36
27	35	30	48
28	40	35	60
29	37	31	46
30	44	33	50
31	42	36	52

Table for June.

	1849. (Deg.)	1850. (Deg.)	1851 (Deg.)
	64	65	70
	65	68	66
	*70	62	60
	66	63	61
	70	65	60
	66	66	64
	68	68	67
	69	65	70
	70	66	†70

Table for November.

	1849. (Deg.)	1850. (Deg.)	1851. (Deg.)
1	34	42	42
2	55	40	58
3	60	44	44
4	45	46	37
5	45	46	32
6	50	47	36
7	50	50	22
8	40	36	25
9	42	34	34
10	45	30	47
11	35	40	38
12	37	44	36
13	36	40	40
14	40	34	42
15	40	35	55
16	42	46	43
17	43	30	42
18	38	28	34
19	50	42	34
20	35	42	34
21	34	36	40
22	47	26	31
23	46	34	30
24	60	34	27
25	60	34	27
26	40	52	34
27	37	50	28
28	34	60	40
29	36	64	30
30	46	44	38

Table for January.

		1850. (Deg.)
	1	20
	2	29
	3	30
	4	40
	5	26
	6	32
	7	50
	8	32
	9	40
	10	45
	11	38
	12	32
	13	36
	14	32
	15	38
	16	44
	17	44
	18	26
	19	13
	20	26
	21	‡
	22	‡
	23	‡
	24	26
	25	31
	26	33
	27	44
	28	48
	29	40
	30	12
	31	4
Feb.	1	12
	2	26
	3	32

Mercury in last week has ranged, in heat of day, from 86° to 90°.
Mercury rose to 88° at 2 P. M.
From home. Range about 28°.

The coldest weather I have known in the valley for the last 16 years, the mercury fell to 6° below zero. The weather here in summer is never very hot for many days together. General range of mercury from 75° to 88°. I have known it as high as 96° occasionally, for 2 or 3 days.

Our winters have been mild for several years past, with occasional cold, generally not lasting a week.

AMHERST COUNTY, VIRGINIA,
January 1, 1852.

SIR: In my communications which have been published in the Reports of the Patent Office, I have answered nearly all of the questions propounded in your Circular; and I must now consider them merely as hints or suggestions in shaping the present reply.

In pursuing the course above indicated, I will make a few suggestions on the subject of *grazing land* with regard to its improvement, and will copy from a short essay I wrote for the "Southern Planter" in the year 1849.

To graze arable land during the whole period it is not in cultivation, is certain to impoverish it; but judicious grazing is often necessary and advantageous. For instance: a farmer has a tract of high land which he wishes to improve, but it is thickly set in sassafras bushes, running briars, and other pests. Now, I contend that "hard grazing," with both cattle and sheep, for at least three years, or until these pests are extirpated, is the more rational system; for if the land be cultivated before they are destroyed, they spring up with the crop, which is injured; and when the field is again cultivated, shrubbing and grubbing have to be resorted to, and a sufficiency of labor expended to pay nearly for the land. On rich land, I think it also advisable to graze clover the first year, as it will keep down the weeds, and prevent their destroying the young clover. On spongy land, also, particularly such as has on it a heavy coat of vegetable matter, trampling the land by cattle is certainly an advantageous practice. But to graze clover the second year, or land almost destitute of vegetable matter, if free from the pests above mentioned, ought not, in my opinion, to have an advocate.

Guano.—I have used guano for the last three years on wheat, oats, corn, and tobacco; and notwithstanding I am pleased with the fertility it imparts, and the increased production from its use on several crops, yet I doubt, with the present low prices of agricultural productions, and the high price paid for the article, whether its general use will be profitable in this vicinity. On land which would have produced about 7 or 8 bushels of wheat without guano, the yield, with the application of 200 pounds to the acre, was about 14 bushels. On poor land, which probably would have made three barrels of corn to the acre, with an application of the same quantity of guano, it yielded between four and five barrels. On oats, the beneficial effect on poor land was greater; but on rich land I could discover no advantage from its use; and on tobacco, the land being very rich, I saw no difference in the plants on which guano was applied, either in their size or early maturity. It is true that clover, following the small grain, is benefited, that a better stand may be

expected, and a more luxuriant growth realized. But when we reflect that at least one in three of our wheat crops is destroyed, or much injured by rust or other fatalities, we may well doubt, at $50 per ton, with wheat at 70 cents per bushel, whether it could be profitably used for that grain on such land as mine.

I would suggest that the inspector of guano should be required by law, in each State, to analyze every parcel or load, and brand on each bag the per centage of ammonia and phosphates which it contains. The guano I bought ast fall was quite damp; and from that circumstance, together with the smell and appearance, I was satisfied it had been adulterated. But as it was ordered from New York, I was compelled to take it. This guano had been inspected, and marked No. 1.

The analysis of several cargoes by the Maryland State chemist shows that the difference in several cargoes of that which was not adulterated, in the per centage of ammonia and phosphates, was very considerable; for one cargo had as much as 18.14 per cent. of ammonia, and 32 per cent. of phosphates; whilst another had only 12.09 per cent. of the former, and 25.80 of the latter; which makes a difference of at least 25 per cent. in the value of the two cargoes, and proves clearly the necessity of having inspectors qualified to analyze this article, and required, by heavy penalties, to discharge their duty.

Fruit Trees.—I would also suggest to those planting peach trees to remove the earth at the root of their young trees in the month of March, tie broom-straw around the body of each tree, and then replace the earth. The straw ought to extend into the ground as far as permitted by the roots, and about six inches above the earth when replaced. I have pursued this course for several years; and although it is not an entire protection against the worm, yet but few trees were injured where this remedy was used.

Tobacco.—This plant is cultivated very largely in this part of Virginia, but, to be profitable, ought to be grown on very rich land for foreign markets, or on new ground to be manufactured at home; for the cost of cultivating an acre of rich land, which will make from 1,000 to 1,200 pounds, is but little more than on ordinary land, which will produce but half that quantity; and the larger sells generally at a higher price than the smaller. New-ground tobacco, for manufacturing, ought to be fine; consequently, must be grown on thin land, as it commands a much higher price.

The Census of 1840 makes the quantity of tobacco grown in Virginia 20,000,000 pounds; whereas the average crop is estimated at 50,000 hogsheads, which is equal to 70,000,000 pounds. But I suppose the Census of 1850 will correct this error.

Very respectfully,

RICHARD G. MORRIS.

BUCKINGHAM COUNTY, VIRGINIA,
December 15, 1851.

SIR: I submit for your consideration the following observations upon some of the topics embraced in your last Circular, a copy of which has been recently received. The county of Buckingham lies on the south side

of James river, seventy miles above Richmond, and is characterized by the same general features as the adjacent counties of Appomattox, Prince Edward, and Cumberland. Our staple productions are tobacco, wheat, corn, and oats.

Wheat.—The varieties most commonly sown are the early purple-straw, the late purple straw, the golden-chaff, the Etrurian, and the Turkey wheat. The Mediterranean and the red May were extensively sown a few years ago; but these varieties are not as much admired here now as formerly. Very little wheat is sown in the month of September, on account of liability to injury from the depredations of the Hessian fly. The usual time of sowing is from the 1st of October to the 15th of November. Could the farmers sow their whole crop of wheat within a few days, they would probably prefer the first 10 days of October. A bushel and a half to two bushels to the acre are sown on rich lots, as well as fertile low-grounds. There is, however, no question connected with agriculture, in reference to which there prevails a greater diversity of opinion, than that of the proper quantity of seed to the acre. From the age of Columella to the present time, this appears to have been a fruitful subject of discussion among farmers. The greatest foe to the wheat crop is the rust. In 1850 the injury caused by rust was immense, but the crop of 1851 was of fine quality, and more abundant than usual. It is difficult, if not impossible, to state the average yield for the county. Some agriculturists who sow wheat appear to rely infinitely more upon their *faith* than their works or their soil. Rejecting all sober and rational expectations of reaping a reward, such persons, buoyed up by hope, and prompted by a sanguine temperament, sow wheat upon land incapable of yielding anything more than a light crop of straw. Fortunately, there are not many of this character. Excluding these abortive efforts, I think the product on ordinary land may be estimated at 8 bushels per acre; on land above the average fertility, 10 to 15; and on rich lots, or fertile low grounds, from 20 to 30 bushels per acre. Those who grow wheat after clover plough the land between the 10th of July and the 1st of September, as their engagements and the seasons will permit. Ploughs drawn by 2 or 3 horses are used, as the depth of the soil and the amount of vegetable matter on the surface may indicate. Some intelligent farmers in Albemarle county plough only once, then sow the wheat and harrow the land. In my opinion, a second ploughing with one-horse ploughs before sowing the wheat, and harrowing the land subsequent to sowing, is a preferable plan, and one that will compensate for the additional labor. A second ploughing with a two-horse plough (instead of a single plough) is sometimes rendered necessary by the amount of vegetable matter which grows so luxuriantly, during hot and wet weather, in July and August. The tobacco crop requires so much attention and labor during the summer, that the mass of our agriculturists have but little opportunity for fallowing land for wheat. Hence, their principal reliance for wheat is upon the tobacco and corn land, after these two crops have matured and been removed. Wheat yields better after tobacco than we can obtain upon adjacent land of equal fertility. This fact, well-known among tobacco planters, was a great puzzle to Judge Buel, of New York, who considered tobacco a great exhauster. This is true; but I think corn exhausts the fertility of our land more than tobacco. The latter is grown upon fresh land, or

upon land enriched by manure, or by the use of clover and plaster. This fact, considered in connexion with the thorough cultivation required by the crop of tobacco, will explain to northern agriculturists why a good crop of wheat is usually obtained from land which was cultivated in tobacco the preceding year.

Within the last five years, several farmers in this and the adjacent counties have sown guano upon their wheat land; and, while I have heard of some disappointment, the testimony preponderates in favor of guano as a valuable fertilizer. This manure condenses great power in a small bulk; and hence its *portability* gives it a great recommendation with all who properly appreciate the value of labor and time. The quantity generally sown upon wheat land is 200 pounds to the acre. I believe that most of those who use guano in Virginia have acted upon the plan—strongly enforced a few years ago—of *ploughing* in the guano *deep*, then sowing the wheat, and covering it by the harrow or one horse ploughs. The reason assigned in favor of burying the guano deep, is the tendency of its ammonia to escape rapidly To guard against this tendency, plaster may be mixed with guano in proportion of one-fourth of the former to three-fourths of the latter; thus combined, the sulphuric acid of the plaster will unite with the ammonia of the guano, and retain it for the gradual nourishment and progressive development of the growing crop. So far as my limited experience has enabled me to judge, I am opposed to ploughing in guano very deep. Instead of ploughing it under to the depth of eight or ten inches, with ploughs drawn by two or three horses, I prefer to plough it in with one horse ploughs, and to cover the guano only three or four inches. In this way I believe the guano becomes more speedily and more thoroughly incorporated with the soil than at a lower depth, and that the effect upon the wheat crop is more beneficial. I am aware that this method has been objected to upon the ground that, although the effect of guano may be very apparent and very salutary when thus applied, it is more evanescent than when covered deep. On the contrary, I think that the effect of guano is not only more decided and beneficial when it is ploughed in superficially, but that its effects are equally, if not more, permanent. Ammonia is one of the most valuable constituents of stable manure; yet the almost invariable practice—a practice sanctioned equally by experience and observation—is to plough in this kind of manure superficially. I have heard of no one in Virginia whose success in the use of guano has been more encouraging than that of Mr. Willoughby Newton, of Westmoreland, who has been convinced by experience that guano exerts a more powerful influence when ploughed in superficially than when ploughed in deep, as recommended by others. This manure augments the crop of wheat, and insures a good stand of clover; but in our country its effect is not supposed to continue more than twelve or eighteen months beyond the period of application. Coleman, in his work on the Agriculture of Great Britain, &c., states that upon some of the meadows of England the beneficial effects of one application of guano were quite perceptible for *three years*. Is not this more protracted effect to be attributed to the comparatively low temperature and humid atmosphere of England? In England guano, when sold, is often warranted to contain 16 per cent. of ammonia. The inspection laws of Maryland and Virginia do not enable the purchasers

of guano to ascertain the proportion of ammonia, although this is the most valuable constituent. Dr. Higgins, the State chemist of Maryland, has lately mentioned the result of the inspection of several cargoes furnished him by the city inspector of Baltimore. In these the ammonia varied from 11 to 16½ per cent.; yet all were passed as No. 1! The inspection laws of both States should be amended, and the price of guano be adjusted in proportion to the amount of ammonia. According to Professor Johnston, this amount has been found to vary from 7 to 25 per cent. in different cargoes imported into England. In Peru the current price of guano is 50 cents per 100 pounds, or $10 for the ton of 2,000 pounds. The price at which this manure is sold in our Atlantic cities being five times as high as the current price in Peru, it is no less our duty than our interest to endeavor to avoid purchasing any unless well assured of its purity. One of the indirect benefits likely to result from the importation of guano, will be the stimulus imparted to the inventive genius of our scientific men. Investigations and researches in agricultural chemistry will be greatly extended, experiments multiplied, and artificial manures of value be probably made. Professor Johnston ascribes the great reduction in the price of guano in England to the efforts of scientific men to make valuable compounds to supersede its use. I trust that the negotiations carried on by our government with that of Peru, in reference to guano, will be successful. If so, the consumption would be much augmented in consequence of the diminished price at which it would be sold. Whether, from any cause, the price be diminished or not, we should not permit ourselves to regard guano as a panacea for the many evils arising from a long continued system of bad husbandry. Fortunately for us, there are other manures and other means, by the judicious use of which our crops may be augmented and our lands improved.

Corn.—The varieties in use are numerous. This grain is made for domestic consumption almost exclusively in this part of the State. The modes of cultivation are very diversified. However defective the plan of cultivation may be upon some farms, the crop is generally cultivated upon more enlightened principles than those which prevailed some years ago. Deeper ploughing during the winter, and a more thorough preparation of the soil in the spring, by the use of the coulter and harrow, previous to planting corn, constitute a part of the present system of cultivation. After the corn has come up, it is important to keep the land open, to prevent the growth of grass and weeds, and avoid breaking the roots of the corn, as well as to complete the cultivation by the commencement of the wheat harvest. To accomplish these purposes, harrows, coulters, cultivators, and single ploughs are used, as the hilly or level surface, and other peculiarities of the field, and the nature of the seasons, may suggest as most appropriate. Manure made upon the farm, being in demand for the tobacco land, is very seldom applied to land designed for a corn crop. Coarse and undecomposed manure from the farm-yard, if hauled out and ploughed in for the benefit of the corn crop, is more injurious than otherwise in this region. Such manure, when thus used, may be beneficial in other States of the Union—as, for instance, in some of the northern and northwestern States, where the atmosphere is more damp and the thermometer ranges not so high as in middle Virginia. It was this kind of manure which Judge Buel, the former editor of the *Cultivator*, recom-

mended to be hauled out in the spring and ploughed in deep, in order, as he maintained, that the process of decomposition might be completed under the ground, and the corn crop nourished and invigorated at the same time. With great deference for his opinions upon most agricultural subjects, I do not approve of this mode of using coarse and half-rotted farm-yard manure *in this locality*. I think such manure had better be hauled out in the spring, and applied as a top dressing to young clover. If plaster be then sown upon the manure, after it has been spread, so much the better. We commence planting corn about the first of April. This grain is our chief reliance for bread, as well as food for stock. The average product may be estimated at from 30 to 40 bushels per acre on low grounds, and on high land from 15 to 20 bushels per acre. When the crop has matured, the best portion of the field is sown in wheat in the fall, and the remainder in oats during the following spring.

The *Oat* crop is generally made upon inferior land; hence I think the average product per acre does not exceed 15 bushels. We make no barley or rye.

Peas and Beans are cultivated for family use, but not as field crops. A few individuals only cultivate peas with any view of renovating the soil. No edible root is cultivated in fields. We have turnip patches of one or two acres, but no turnip fields, as the farmers of England have.

Potatoes.— Irish and sweet potatoes are grown for domestic consumption, though not for sale.

Unfortunately for us, we pay very little attention to *meadow-grasses*, and, of course, meadows "are few and far between." The amount of hay obtained may be estimated at 1½ ton per acre. Timothy does not thrive well in our climate; and I regard herds grass as the best and most hardy grass we have. Clover succeeds tolerably well; but does not attain that luxuriance of growth here which it does in several counties immediately below the Blue-Ridge.

In reference to *Dairy Husbandry*, I have only to remark, that no cheese is made; and, while the planters have milk and butter enough for family consumption, very little butter is sold.

The stock of *cattle* has, within the last fifteen or twenty years, been improved by crossing with the Durham and Devon stocks. You ask, "What is the cost of raising neat cattle till three years old; the usual price at that age; and the value of good dairy cows in spring and fall?" To raise a calf till three years old may be estimated to cost $8; and, at that age, it would be worth $16. A good dairy cow, with her calf, in the spring, is worth $24; by the fall, her value would be reduced to $17 or $18.

Sheep.—We keep sheep, more with the view of obtaining lambs and mutton for our tables than for the purpose of selling them, or because we desire to sell wool. No person in this portion of Virginia keeps large flocks of sheep for the special object of *wool-growing*.

Hogs.—The stock of hogs may be considered fair. The planters raise hogs enough to furnish their families with a liberal supply of good bacon.

Fruit.—The culture of fruit is receiving increased attention, though not to that degree which this subject merits.

Tobacco.—The agriculturists of this portion of Virginia should be regarded more as planters than farmers. Although we sow a good deal of wheat, our principal crop is tobacco. The greater portion of our

manure is annually applied to land intended for this crop. Tobacco is grown upon fresh land, manured lots, and upon land improved by the use of clover and plaster. Some planters in this and the adjoining counties have used guano with success in the production of this staple. I have sown guano at the rate of 200 pounds per acre upon tobacco land, and ploughed in the guano with two-horse ploughs; and I have also used this manure in the hill for tobacco; but the effect upon the crop disappointed me, and was far less beneficial than the effect produced by guano upon my wheat land. The average product of tobacco in this county may be estimated at 700 pounds per acre. I know of no new process of culture. This crop requires a greater amount of labor than any other; and, if the planters were dependent upon the labor of hirelings, very little, if any, tobacco would be made in Virginia. The attention and labor requisite for the production of this staple preclude the planters from making many improvements, which would contribute not less to the value than to the embellishment of their estates. I do not wish to be understood as maintaining that the agricultural improvements of our country are incompatible with the cultivation of tobacco; but I am confident that our progress in improvement would be much more rapid if the planters generally would reduce the amount of this crop. If they would plant not more than half the usual number of hills, more labor and time could be devoted to other useful purposes. Agriculturists are, however, reluctant to abandon habits to which their ancestors, as well as themselves, have been accustomed. With them, change is a slow and gradual process. Unlike some of the political empirics of the present day, they do not always regard innovation and improvement, alteration and reform, as synonymous terms.

Manures.—We have no marl or lime, and we rely mainly upon the manure obtained from our stables and farm-pens. Into the latter we haul our corn stalks, and feed with straw, shocks, &c. The cattle eat what they want, and trample the remainder under their feet. Occasionally, during the fall and winter, leaves are hauled from the forest and put into the stables and farm-pens. In the spring the stable manure is hauled out, and, being spread, is then ploughed under. The well rotted portion of the farm-pen manure is used in the same manner. The coarse and undecomposed part of the farm-pen manure is used in the spring for top-dressing clover, or is allowed to remain until the fall, and is then hauled out and ploughed under for the benefit of the wheat crop. Many planters sow plaster upon their manure before it is ploughed under. The abundance of land within the limits of our vast confederacy, the low price at which land is sold by the government and by individuals, the sparseness of population, the high price of labor, and the want of capital, have all tended to retard the agricultural improvement of the United States. The influences of these peculiar circumstances have been great, and they have not ceased to operate. Notwithstanding the rapid increase of population, the price of labor continues high. It cannot now be profitably employed in the cultivation of poor land; and this obvious truth has attracted attention and excited thought. The importance of enriching the soil is acknowledged, and more than ever appreciated. It is also gratifying to know that agriculture is no longer regarded as undeserving the notice of the educated and intelligent. Some years ago agricultural books and papers were derided and denounced; but that day

has passed. Works on agriculture are now bought and studied, and agricultural papers are in demand. When men seek to acquire scientific knowledge—when they evince a desire to profit by the suggestions and experience of others, as well as their own—no apprehension of a retrograde movement need be indulged. And if the *planter* should not be able to travel along the path of improvement *pari passu* with the farmer, each should zealously strive, within his own sphere of action, to augment the national wealth, as well as to impart elevation and dignity to his pursuit.

Respectfully, yours,

R. T. HUBARD.

Hon. THOMAS EWBANK.

BUCKINGHAM COUNTY, VIRGINIA,
December, 1851.

SIR: In responding to your Circular, I commence with your first article—

Wheat—which in this part of the State is secondary to the tobacco crop—the latter being more certain and less subject to disastrous seasons; yet there is generally a full seeding.

The crop of the present year, owing to a very favorable season and the use of guano, which we have harvested, is perhaps the largest and most perfect ever made in the State, some lands yielding 30 bushels to the acre and weighing 65 pounds to the bushel.

I feel inclined to state the average in this middle region of Virginia, from the head of tide water to the mountains, at 15 bushels per acre.

I estimated an acre, seeded with wheat in good style, harvested, and put up in hand-stacks, worth $6. For hauling in, threshing, and winnowing, the offal of straw, chaff, and tail-ends, is abundant pay. Our varieties are early purple straw; stands up well; small grain and red; New York white flint, white, beardless, and beautiful grain, late.

White and red May, (so called,) with forward weak stalk, apt to fall. Old yellow lammas the first wheat seeded in Virginia; red, beardless, and very productive; difficult to obtain pure. Mediterranean, black as rye, suits poor land. Upon good it will tumble, and a tremendous beard. Zimmerman, smooth head, good grain, recently introduced from the continent, is much liked. Every kind has its favorites, and all are liable to fail in disastrous seasons.

I prefer the early ripe purple straw, it being more exempt from rust and mildew, and not liable to tumble, and the Polish or blue stem, some of which I obtained from a neighbor, exclusive of my Patent Office little stock, of which I shall treat in this letter. The Hessian fly, of late years, is scarcely dreaded. The improvement of our lands, and better tillage, with a little later seeding, has lessened their damage greatly. But a new enemy has appeared, called the "joint-worm;" as yet I am thankful that it is unknown to me. Here I will remark that I received from your honorable predecessor (Mr. Burke) three kinds of wheat, about a half pint of each, under the name of red straw, Chinese, and Polish. The first, the red straw, has a smooth tapered head, red, lean, small grain,

unproductive; the earliest ripe I ever seeded; yet I do not appreciate it. The Chinese is a lofty, strong-stalked bearded wheat, white grain, large heads, 6 to 7 inches long.

I have strong objections to bearded wheat; touch a beard, and the mesh opens and the grain is lost; besides, the chaff is not fit for food, and the straw is generally harsher and not as good for stock as smooth-headed wheat straw.

Upon upland plantations, off water-courses, where there is less fog and dews, I think the Chinese wheat would probably succeed well. The last, the Polish wheat, I consider acclimated and very productive. I have increased the half pint to 8 bushels in 3 years, which is now drilled in good land and in good style. It is beardless, white, and a very large grain, with strong stalk.

I see, by the last Reports of the Patent Office, that it is very favorably spoken of in New England, under the names of Polish and blue stem; here, in Virginia, it is called Polish or Woodfin. By comparison, I am satisfied that it is the same wheat, and that it emanated from the Patent Office. I consider it a valuable acquisition to the country, and that the Patent Office is fairly entitled to the credit of its introduction. From the 15th of May to the 27th of July we labored under excessive drought; the entire fall of rain was only 3 inches. The average of the thermometer, in a cool room in May, was 75°; in June, 78°; July, 80°. With drought and heat, the oat crop was rendered unusually short; also the corn crop, a plant requiring more moisture than any other, and is now selling from 60 to 80 cents per bushel, according to the drought in different sections. The kind of corn most preferred is a flinty white gourd seed.

Guano (Peruvian) is getting into pretty general use, and the results are favorable where judiciously applied.

I will give my own experience. In 1849 I purchased two tons, and applied it to wheat, oats, corn, and tobacco. It was sown broadcast and ploughed in about six inches, seeded in wheat; the guano was 100, 150, and 200 pounds to the acre, and staked off.

The difference in each was according to quantity of guano—the 200 pounds decidedly the best; and I judge, with a view both to profit and economy in its use, that that is about the right quantity.

I estimated that acre to have yielded 25 per cent. more grain, and 10 per cent. more straw, by comparison with adjoining wheat not guanoed. The effect under oats equally good. It was applied to corn, by dropping into the furrow as much as could be taken up with the thumb and two fore fingers, and earth drawn over it with the foot, and the dropper's track made upon it as a guide to drop the corn. It was applied much in the same manner for tobacco.

The augmented yield was very obvious, but not as great as upon the wheat and oats. Perhaps the quantity applied by the thumb and fingers was not sufficient.

To ascertain most certainly the great benefit of guano, apply it upon very poor land, where but little more than the seed of wheat or oats would be expected, and the yield would be surprising.

Many persons assert that it will insure a good stand of young clover; but if drought occurs, and a hot sun prevails after harvest, I will warrant that much of the clover will perish, unless a dressing of plaster is given.

In the fall of 1850 I purchased ten tons of guano, ploughed it under,

as before stated, using about 200 pounds to the acre, and seeded wheat, leaving occasionally beds not guanoed. Verily, the eye said the guanoed wheat would yield double.

The last spring I prepared a lot for tobacco of old corn land that had been in cultivation more than a century, and never a pound of manure put upon it—tended in corn the previous year; the product I estimated at 20 bushels per acre. The ground, when prepared, was checked in squares three feet four inches; a table-spoonful of guano was scattered upon the check; the hilling close up, to prevent the escape of the ammonia; the hills were cut off about four inches above, and planted in May. The drought prevented the plants taking root or bringing the guano into solution. There was no growth whatever till the 27th of July, when we had rain; the growth was then, in a week, wonderful; the plants obtained a fine size. A second drought occurred in September and October, which protracted the ripening, and the plants faded and assumed a yellow hue.

This induced the opinion that guano is a great stimulant, and not a durable manure. It is too costly for general use by small farmers—indeed for the wealthy—when they have heavy transportations to pay. I humbly believe that an article of such vast importance to the world should be regulated by commercial treaty by the different governments. Most certainly it ought not to be under the control of a company of capitalists, to exact their own price.

I recommend renewed efforts to convert everything animal, mineral, and vegetable upon the farm into manure: such as cornstalks, wheat straw, chaff, oak leaves, pine tags, (which are richer than oak leaves,) ashes, and bog soil; and, with proper efforts, much more can be done than has been done. For any deficiency, we must rely upon the great auxiliaries—clover and plaster. By thus managing, we can renovate our exhausted grain fields, and avoid the necessity of selling the bones of our fathers and removing to the fertile lands of the Mississippi valley.

As to *breaking oxen*, I rope them around their horns, yoke them forthwith, tying their tails together very securely, lest they carry their hinder parts out of line, and risk breaking their necks; put an old yoke to the tongue, another in the lead, the young yoke in the centre. Should one prove sulky and lie down, do not whip nor ring the tail; release him from the yoke, and cord a fore and hind leg together; leave him just as he lies. After a while the sulk will pass off, if he has not been beaten, when he will struggle to rise, but cannot, which alarms him. After much struggling, loosen the cord, but make no effort to force him up; it is best that he chooses his own time. Yoke him again the next day. It is seldom they sulk and lie down when they are not beaten.

The former mode of breaking was to tie them to a tree or post 4 or 5 days, to make them gentle; the reverse was the result. Their great efforts to obtain their liberty made their heads very sore, rendering them fretful, more intractable, and often vicious. I am decidedly of opinion that it is good economy to feed corn in the form of meal to horses, mules, and oxen—more especially to old animals that masticate corn imperfectly. I believe that 3 quarts of meal impart as much nutrition as 4 quarts of corn—the former to be well mixed with chaffed hay, straw, corn-shocks, chaff, &c. *Pork hogs* ought to be fed upon meal made into dough, kneading it with a weak ley made of hickory ashes—

salt and cayenne-pepper added often; it is a condiment they are very fond of, and aids their fattening. If cooked, no doubt it would be better. I think a hog that has attained his full growth, should be regularly fed three times a day in this manner, upon a floored pen, good, clear, running water, with a good bed, and never to be disturbed when asleep—never even to be fed. With a plenty of pumpkins, cymblings, turnips, and roots of every kind, at every time of feeding, the stomach being fitted for distention, he might be made to gain 8 pounds of flesh upon the consumption of 100 pounds weight of corn.*

The best *beef* is a poor ox made very fat, or a speyed heifer. To fatten an ox, I would feed on dry meal, with as much wheat bran, dry, also, as would, at any feed, fill his stomach to distention; bleed him once a week, which I know is very beneficial, with the use of the curry-comb; and with this treatment, he cannot gain like the hog. I would judge 5 pounds to the consumption of 100 pounds of corn.

I know not the difference, if any, as to the fattening properties of the Durhams, Devons, Herefords, or other improved breeds. I know I can fatten a Devon upon less food than a Durham, which is a larger animal; and I suppose food is required in proportion to bulk.

In reply to your Circular of the last year, I was very lengthy upon the subjects of curing bacon and tobacco, which appear in your last Report; to which I beg leave now to refer. All which is respectfully submitted.

Yours, most obediently,

CHAS. YANCEY.

To the Commissioner of Patents.

Variety Shade, Buckingham,
January 1, 1851.

Dear Sir: I have been so much pressed with business engagements that I have not had a leisure moment before this to reply to the Circular from the Patent Office, of August 16, 1850.

Before I proceed to answer such queries, in the Circular referred to, as I am conversant with, permit me to remark that, whilst I am extensively engaged in agriculture, perhaps to as great an extent as any one in the county, and have given as much, if not more, personal attention to the subject, it has been my misfortune, from some cause or other, to have received but a single copy (that of 1848) of that valuable document, the "Patent Office Report." This valuable document should, in my opinion, be printed, and sentwithout stint throughout the broad extent of the Union, and thus become a medium of interchange of opinions among the agriculturists of the country.

Wheat.—I have been engaged in farming since the year 1824. I have cultivated almost every variety known or used in the country. The varie-

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[* One hundred pounds of cornmeal ought to produce 25 pounds of pork, instead of 8 pounds; and the like weight fed to a growing steer, or healthy ox, should yield 20 pounds of flesh. Five pounds of corn should never return less than one pound of flesh in meat making. Three and a half pounds of meal gave Mr. Ellsworth, former Commissioner of Patents, a pound of pork. (See Patent Office Report for 1847, page 535.) One hundred and five pounds of meal increased the live weight of two pigs 34 pounds 2 ounces in 15 days. See, also, reports in this volume, passim.]

ties in cultivation in this section are numerous; the most esteemed, and those to which I give preference, are the early purple straw, the white purple straw, (called by some the "Woodfin," by others the blue stem,) and the Lolla, a beautiful white and very safe wheat, if sown early on high, dry land; but in nowise safe sown on flat land. The average product is about 10 bushels per acre. Time of seeding, 20th of September to 1st of November; if practicable, I would prefer seeding the entire crop from 5th to 15th of October; harvested from 15th of June to 4th of July, varying as to season. The only preparation in use among us is to soak the seed in a strong brine; seed from one to two bushels per acre, according to the strength of the land, broadcast—the drill not being used. One bushel is considered enough for thin land, and two for rich fallowed land and tobacco-lots. The plan most approved in this section is to fallow clover land in the summer – in the months of July and August—three-horse ploughs being used; refallow with two-horse ploughs at the time of seeding; sow, and then harrow. This plan I pursue, and regard it as the best, having experimented with all the different modes of getting it in, from the naked coulter to the cultivator, harrow, &c.; though in this view I find that I come in contact with my friend, Mr. Wm Gilmer, of Albemarle. He, in very strong terms, condemns the refallowing system. No universal system can be adopted; soils varying almost as much as the faces of men, what would be a good plan of cultivation in one kind of soil might be decidedly bad in another. Thus I account for the difference of opinion between Mr. Gilmer and myself. In Albemarle they have a red, light soil, with a strong, rich, clay foundation, which, when well fallowed, does not become hard before seeding. Here we have a gray or black soil, with hornblende rock interspersed, resting upon a good clay foundation, universally regarded as good wheat land; and the refallowing is the favorite and most successful system.

The average yield is, I think, upon the increase; but the crop is certainly more liable to disaster now than in former years. When I speak of the average yield being more than in former years, I mean to except that period when but little wheat was made, and that seeded on rich, fresh land. Lime has not been used except in a very partial manner. I feel satisfied that our lands are peculiarly adapted to its use, and that the quantity of wheat would be greatly increased thereby. Thus far we have been prevented by the expense; many of us are looking forward to a period, not remote, when we hope the cost will be reduced so as to allow its liberal use for agricultural purposes. The James River and Kanawha canal, shortly to be opened to Buchanan, in the lime region, we trust will have this effect.

I practise the five-field system; having every year two fields (two-fifths) in wheat, one field (one-fifth) in corn, and two fields (two-fifths) in clover. I have the same number of tobacco lots, and cultivated in the same way; one fifth in tobacco, two-fifths in wheat, and two-fifths in clover; thus it will be seen that I fallow one clover-field and one clover tobacco-lot each year, and sow in wheat along with the corn and tobacco land. I know of no remedy for the Hessian fly. I am of opinion that this insect, so injurious to the wheat crop, is with us annually, and that the evils resulting from its attack can only be overcome by favorable seasons. If the months of October and April are favorable and growing months—the time at which the injury is inflicted by the insect—the

wheat branches and outgrows the injury; on the contrary, when these months are dry and harsh, the injury is inflicted when there is not sufficient warmth and moisture in the land to nourish the plant. A certain preventive of the white weevil is to have your wheat well cured before it is shocked in the field, and threshed out early, in good, dry order; and, my word for it, you will never see in your barns black weevil.

The crop, the present year, was very much injured by the rust; consequently the price varies, according to quality, from 60 to 95 cents, at our nearest market.

Corn.—The most esteemed varieties are the gourd-seed, large white, and large yellow, or Nansemond, of which the latter for stock is decidedly preferable. I do not think much importance ought to be attached to the variety, as any kind may be so improved as to increase both quantity and quality by selecting the best ears from the most prolific stalks. My practice for years past has been to select my seed in the field, by taking the best ear from the stalk bearing the greatest number. Owing to the great diversity of soil, the average product varies very much on James River bottoms—from 40 to 50 bushels; best high land, about 30 bushels; and 5 bushels on the ridges; reducing the average to something like 15 or 20 bushels. Cost of production about 30 cents. The common method of cultivation is to plough deep in the fall and early part of the winter. In the spring, before planting, let the land be well pulverized by harrowing. Lay off and plant in drills 4 to 5 feet apart; stalks, from 8 inches to 2 feet in the row, according to the quality of the land. When the corn is up about 6 inches, use the plough or cultivator, according to the condition of the land, thinning, at the same time, and brushing with the hoes. Afterwards, use nothing but the cultivators, and a small quantity of earth put to the corn with the hulling hoe. By this plan, you keep your land level, which I regard as the best system of corn culture.

The best method of feeding is to grind and mix with cut, rough food for horses. Nothing of the fodder kind should be fed in the rack. For swine and horned cattle, I would recommend both grinding and cooking.

Oats.—Average product of this grain, 15 bushels per acre to 1 or 2 of seed. This crop is a great exhauster; so much so, that I doubt the propriety of raising it to any extent.

Peas are not cultivated as a renovator. I have made some use of them this year for this purpose; but, as yet, am not entirely satisfied that I can do so profitably. I purpose making further experiments, this last having been made in an unfavorable season.

Clover is extensively used for hay and grazing; and, as a renovator, it yields from one-half to two tons per acre, requiring one gallon of seed.

Neat Cattle, Sheep, and Wool, except to a limited extent, are only raised for home consumption and use.

Hogs.—I have tried the no-bone, Bedford, Surrey, China, Berkshire, and Irish grazier, and find that any one, without *frequent crossing,* will rapidly depreciate. 100 pounds of corn will produce 40 pounds of pork. The plans of curing are very numerous, each having their advocates; but the plan I suggest is one that I have practised for many years, and have never failed in having *good sweet bacon.*

After killing, allow the *animal heat to escape.* Cut out, and, when perfectly cool, to each ham and shoulder put one-half teaspoonful of saltpetre, and sufficient salt, well rubbed in. Pack down, after remaining,

joles and sides, 3 to 4 weeks; hams and shoulders, 4 to 5 weeks; take out and rub with dry hickory ashes. Then hang and smoke gently, with oak or hickory chips, in dry weather only. About the 1st of June, take down and pack in dry ashes, or pulverized charcoal.

Tobacco.—Average yield per acre, about 800 pounds. Cost of production, about $4 per hundred, or $60 per hogshead.

Mode of cultivation and curing.—I would state as follows: Permit your tobacco to get thoroughly ripe before it is cut; scaffold it in the field until it yellows or spots freely; then house, with gentle fires under it, until it yellows throughout; then gradually increase the fires, drying the leaf slowly about half-way; this will take some three or four days, sometimes longer if the weather is cool. The heat that I prefer for the first three days should be about equal to a hot day in August in the sun; the fourth day, about 110 degress; after this, when it comes in what would be termed soft order, fire again so as to dry the entire stem; and firing is necessary afterwards, unless in very damp weather. In December take down, in soft stripping order, passing it through about three hands, each of whom should whip it against their thighs, to get off the dust and dirt before reaching the bulker. Your tobacco is now ready for stripping. When you commence, each day's stripping, being first carefully assorted and sized, should be passed, two bundles at a time, through several hands, straightening it when passing to the bulker, who lays it straight in bulk, upon which a good portion of weight should be placed; afterwards, in *soft days*, pass it again through as many hands, one bundle at a time, each bundle straightened as before, and rebulk, weighting very heavy, (with rock;) let it remain in this situation until the last of March, then rehang without opening the bundles, except just below the tie, having your sticks, for this purpose, small, and made smooth with a draw-knife. The stripped tobacco, being now hung up to dry out, should be closely watched. If the weather is moist, take down on the sticks; for if permitted to remain and get in *high order*, all your labor in straightening is lost. The first warm season after it has dried out, take it down when the leaf is in pliant order, and the stem, by pressing, breaks freely; passing again through several hands, rebulk and weight heavily; in a short time prize, laying it straight in the hogshead.

Manures.—I do not know that I can give the best system for making manures; my plan is to feed corn-stalks, scatter leaves and other vegetable matter in the farm pen, so as to increase the bulk to as great an extent as possible. In the spring haul out upon tobacco land, and top-dress young clover. I feel confident there is great deficiency in management in this particular. The *exposure* of manures is certainly very injurious; they should certainly, if possible, be kept under cover until ready for use. I have made some experiments with guano. In November, 1849, I used one ton on wheat on thin land; last summer the same quantity on oats, corn, and tobacco. That on wheat increased the product from 6 to 12 bushels per acre, and fully repaid the outlay; not so with that on oats, corn, and tobacco; the benefit was very slight. I have made a further experiment this fall, using 2 tons to 20 acres, (200 pounds to the acre.) My experiments have satisfied me that it may be used profitably on wheat upon thin land, if the price could be reduced to about $40 per ton; but I regard it as unsafe for a summer crop. It is in

dry weather decidedly injurious; should the summer be moist, I have no doubt it would be beneficial; but our summers being frequently quite dry, I regard it as too hazardous. My mode of using it was to sow it down and turn under with a three-horse plough.

Very respectfully,

TH. M. BONDURANT.

WIRT COURT-HOUSE, VIRGINIA,
January 27, 1852.

SIR: In answer to your Circular, I would say that our farmers still follow the old method of farming.

Wheat is sowed on fallow ground, and after corn crops. The latter is put in with the old shovel plough, and the former generally with the harrow. The varieties raised are the red chaff, the white wheat, and the Mediterranean. The Mediterranean is considered to be the surest crop; but the yield is not so great as, and the flour is inferior to, white wheat and red chaff. Guano is not used, nor any other manures, save, now and then, a few wagon loads of barn-yard manure to the acre; so that it is hard to tell what our lands would do if properly manured and fertilized. Under the present mode of cultivation, the average yield per acre, of clean wheat, is about 8 bushels; although some land will bring from 20 to 30 bushels per acre; and I believe that the greater portion of our tillable land would, if properly fertilized and cultivated, bring, upon an average, 20 bushels per acre. The rust damages the wheat in this section of the country more or less every year. In 1850 it caused almost an entire failure of the wheat crops in all northwestern Virginia. Early wheat suffers less from rust than late wheat. To avoid the rust, farmers should sow their wheat in the early part of September, when the season is favorable. Of the varieties of wheat mentioned, the Mediterranean is less liable to take the rust. Whether this is owing to any peculiarity in the growth of the wheat, its nature, or whether it be from its earlier growth and maturity, is not yet decided; but it is generally believed to be owing to its earlier maturity.

Corn and Oats grow well here; but little more is made than satisfies home consumption. We cannot compete with other portions of the State in raising corn. Ohio, Indiana, and Illinois can produce it, in many instances, for 10 cents per bushel. We can scarcely produce it for 30 cents per bushel; yet, in market, we get no more per bushel for our corn than they do for theirs.

Fruits of nearly all varieties grow well in our soil and climate. Apples, peaches, and plums are the principal fruits grown here; but none are cultivated for distant markets, as we are not situated near any public thoroughfare that can be relied upon to convey our fruit to market at the precise time we might wish it. Although we have no reliable markets for our fruits, yet the sweet apple might be very profitably cultivated for stock, especially hogs. It is believed that one acre of well-grown sweet apple trees would produce apples that would fatten more hogs than the product of five acres of the average corn crops; and the expense of the former would be nothing in comparison to the latter mode of fattening.

Sheep.—This county is well adapted to the raising of sheep. The expense of their growing is but a trifle, in comparison to that of any other stock. They thrive well on our hills; and it is generally conceded that the wool will pay all yearly expenses in their raising, thus giving all the increase of the flock as a net profit. One hundred good ewes, if properly managed, will yield yearly, at least, the same amount of lambs. The bucks ought not to be permitted to run with the flock before the last of October or first of November; then the lambs would come about the first of April, when there would be plenty of grass for the ewes to subsist upon without much feeding, and little or no loss of lambs from cold weather and other casualties connected therewith. I am satisfied that, if our farmers and sheep-growers would adopt the above plan, they would save annually two-thirds of the lambs that perish from cold and exposure consequent upon coming in mid-winter. Wool brings here from 25 to 35 cents per pound. The average amount of the fleece is about 2½ pounds. Sheep bring from $1 to $1 50 per head, when sold to the drovers; if slaughtered here, they bring from $2 to $3 per head.

Tobacco.—The staple product of the county is destined to be tobacco. The plant thrives well here, and our soil seems to be peculiarly adapted to its culture. In the past year it has been tried in all parts of the county with very favorable results. I think that the average yield per acre may be set down at 1,000 pounds. Some of the best fresh land will yield from 1,500 to 2,000 pounds per acre. The average price per 100 pounds is $5—it often brings $70 per hogshead; so that an acre of ground will give $50, on an average, and often $75 to a $100. There is nothing that our farmers can cultivate that will yield the same amount of money per acre. Wheat will produce, on an average, $8; corn not more than $10; and oats not over $6 per acre; yet it takes very little more labor to cultivate an acre of tobacco than an acre of corn, and the value of the former is so much greater than the latter, that I think all our farmers who hold tobacco lands stand much in their own light if they do not pay more attention to the culture of tobacco. There is scarcely a farmer in the county that cannot raise from two to six acres of tobacco and not miss his time from his other crops. In order to insure good crops, it is very necessary to set the plants out as early in the season as possible. The mode of curing here is by sun-drying. Care should be taken, in housing, not to hang too close, as several of our farmers here had their crops severely damaged by the tobacco heating from being hung too close.

Our farmers heretofore have paid but little attention to agricultural pursuits, as it is not profitable to produce more than they can consume. Their attention has mostly been turned toward the lumber business, of which a great amount has been done in this county. But timber is failing, and the people will have to turn their attention to agricultural pursuits. I should like to see many of your Reports circulated in this county. If the Department have any valuable or new variety of tobacco seed, or grass seed, I would thankfully receive it and distribute it to such of our farmers as would give it a fair trial. The Brazilian, Persian, pear-tree, and Cuban tobacco would be thankfully received, as I believe we have none of these varieties.

I am, very respectfully, yours, &c.,

J. W. HOFF, M. D.

Hon. THOMAS EWBANK,
Commissioner of Patents.

NEAR JERUSALEM P. O., SOUTHAMPTON CO., VA.,
December 29, 1851.

SIR: The Circular sent out from your Office in quest of agricultural information has been forwarded to me by General Millson, the representative in Congress from this district, probably with the expectation that I could answer some few of the inquiries therein contained.

Could I but contribute the smallest mite in furtherance of the valuable object of your Reports, it should not be withheld. But, although the day of improvement has dawned upon us, yet for a goodly time to come we must borrow light from others, scarcely hoping to reflect a ray in return.

So far as your inquiries relate to the productions of this county, they have, for the most part, been heretofore answered, and of course a repetition is not desired.

Guano.—In reply to your special inquiry as to the use of guano, and the increase of production resulting therefrom, I can only give an account of the two experiments in connexion with the last crop of wheat. They were both satisfactory, according with many already published to the world. Mr. Alfred Ricks, one of our most particular and attentive farmers, made an application of 200 pounds of guano per acre to 7 acres of land; 4 of which were good corn land, producing 25 bushels to the acre; the remaining 3 so nearly sterile that they could not produce more than 5 bushels of corn to the acre; the whole, being a light soil, approximating to sandy, was unsuited to wheat culture; and a strip 26 feet in width was left, for comparison, in the centre of the good land, without any guano, and the product was scarcely sufficient to pay for harvesting.

The aggregate production of the seven acres was 76 bushels, weighing 64½ pounds to the bushel at the mill. There was but a shade of difference in the wheat on the poorest and best land, and the guano should be credited with nearly the whole crop. As far as seen, the best land produced so poorly that it was scarcely worth housing, and the poorest certainly would not have produced wheat at all. A still more successful experiment was made by Dr. Carr Bowers, who has a great deal of system in all he does, and is probably making greater effort to improve his land than any other person in the county: 220 pounds of guano per acre were applied to 4½ acres, accurately surveyed; the land being previously fallowed, the wheat and guano were harrowed in together, and gave a product of 113½ bushels, or 25⅝ per acre. In consequence of the wheat being badly lodged, there was much waste. It is believed that, could the crop have been neatly saved, it would have been little short of 30 bushels to the acre. I will here remark that this plat of land was naturally much better capacitated for the production of wheat than that on which Mr. Ricks experimented, being a gray soil, with considerable mixture of clay; and, without the dressing of guano, would have produced 10 bushels to the acre. I omitted to say that Mr. Ricks first sowed his guano, and turned it in 6 or 7 inches deep, and harrowed in the wheat.

The several experiments made in this vicinity, in connexion with the corn or maize crop, have been attended with varied results. One of our successful farmers informed me that, from the application of about half a ton to a part of his last crop, there was not the slightest apparent benefit. The application was made, as usual in this section, in the hill, covering it with a portion of earth to prevent it from coming in immediate contact

with the grain. The expediency of its purchase, and application to summer crops in this thirsty climate, is questioned by many.

In the present state of opinion, much more could probably be done by fixing attention on means of resuscitation—within reach of nearly every tiller of the earth—such as the offal from the crops made, the collection of leaves from the forest, including the mould from lands reserved for timber, combined with the rich deposit to be found in many of our swamps and ravines. These means alone, if properly applied, would, in ten years, double the poorest of the whole cultivated area of this part of the State. But nothing of importance, by way of improvement, can be accomplished without reform in two particulars—a cessation from the cultivation of lands that evidently do not pay for tillage, and an abandonment of the cotton crop, which should be left to the far South and Southwest. Without looking to the future, I hold it to be perfectly demonstrable that, even as to present profit, corn is a better crop for us.

It is generally conceded that land with us, which will bring 600 pounds of seed cotton, or 150 pounds of picked, will produce twenty-five bushels of corn to the acre, and that the labor required to cultivate 1 acre in cotton will cultivate 1½ acre in corn. The fodder, shucks, &c., will pay for harvesting the corn, whereas it will cost at least 15 per cent. of the cotton crop to secure it after it is made. *Corn*, for the last ten years, has with us been worth 50 cents per bushel. During the same period, cotton has not been worth $10 per hundred; but place it at that figure, and we have $18 50 for corn, against $15 for cotton; minus 15 per cent. for securing the latter. The most usual objection to the corn crop is difficulty of transportation. This applies with little force to a large part of Southampton. The city of Norfolk is our principal market, and we have two navigable rivers in the county, and a railroad sweeping twenty miles of its southern borders. Were it otherwise, we have an alternative.

Pork.—Corn is easily converted into pork. In the Report of 1849–'50, it is stated that Mr. Ellsworth succeeded in making 1 pound of pork to 3½ pounds of corn; but that most farmers estimate it to take 5 to make 1. I will be still more liberal than that, and even then show that corn and pork are better than cotton. With us it is usually supposed that 10 bushels of corn will raise and fatten 100 pounds of pork, and I will add 10 per cent. for casualties. Our white corn will average 53 pounds to the bushel; it will, therefore, be 583 pounds of corn, or eleven bushels, to each hundred pounds of pork.

Where cotton is estimated at 10 cents per pound, pork should be placed at 5 cents per pound; and, according to the foregoing estimate of the product of labor, we have 340 pounds of pork at 5 cents per pound, against 150 pounds of cotton at 10 cents, without making any deduction for picking out the cotton. Be this as it may, I know of little improvement where the marketable crop has been cotton, it requiring every effort to keep up the cotton land, while the rest of the farm is undergoing annual deterioration.

Most respectfully, yours,

J. D. MASSENBURG.

Hon. THOMAS EWBANK,
Commissioner of Patents

HICKORY CREEK, LOUISA COUNTY, VA.,
January 1, 1852.

SIR: I observe in my letter, published in the Patent Office Report for 1850-'51, that a mistake occurred, which I do not think I made. The words, "*and curing what I have left,*" should be omitted, for I cure the whole plant with the priming leaves on it, and strip them off as lugs when I strip the plant, which is a very easy process. It would require much time and labor to cure the priming leaves separately.

The cultivation of tobacco, and its preparation for market, require many tedious processes, and none should be added that can possibly be avoided. I will observe, further, that my remarks applied to manufacturing, and not to stripping or stemming tobacco.

Indian Corn.—The most important crop of the United States is unquestionably maize, or Indian corn. The southern and western farmers rely upon it as the main staff or support of their families. It is the most certain and abundant of the cereals, and its place cannot be supplied by any other. He who can improve the varieties, or in any way increase the product, will do infinitely more than he who makes two blades of grass grow where only one grew before. Within my recollection, great improvements have been made in the culture of Indian corn, chiefly by deep ploughing and thick planting. Thirty or forty years ago, the ordinary plan adopted here was to plough the land very shallow; then to lay it off at right angles, up hill and down, in straight rows, five feet apart, when it was intended to leave two stalks in a hill, and four feet distance, on poor land, to leave one stalk. The land, after planting, was ploughed each way four, five, or six times, before it was laid by, and 15 or 20 bushels per acre was considered a good crop. This mode of tillage impoverished the land, which was generally washed into gullies by the rains, and then turned out to grow up in old-field pines and broom-sedge. On the ridges and hills of corn-rows made forty years ago can now be seen piny thickets, in which the trees are now large enough to make good rails or poles for a log-house. Yet this land is not exhausted, but improved, by the pine, and, when cleared up, will produce better, or as good crops, as it did in its virgin state.

My plan of cultivating corn, though perhaps not as good as many other farmers', is better, I am sure, than that of some. I think I can produce as good crops with as little labor as most others. Men are slow to learn; they require line upon line, and precept upon precept, before they become willing to quit the old and beaten track their fathers followed. Many valuable practical essays have been published and widely circulated on the culture of corn, which have made little or no impression on the great mass of farmers. I will detail my plan, which takes but little labor, and generally produces a good crop. If it benefit one farmer, or improve his practice, I shall consider myself amply paid:

I fallow the land as deep as I can, beginning in the foulest land as soon as I can, after seeding wheat is over, and so continue, in the good weather through the winter, leaving the cleanest land for the last. Just before the planting season, (April,) I get as much manure as I can of all kinds, and spread or sprinkle it over the poorer parts of the field; then harrow well, and lay off the rows for planting, four and a half feet apart, horizontally on hill lands; then drop three grains of corn, from 2 to 2½ feet apart, (using plaster on the land,) and cover it with the hoe. A good

corn-planter is more expeditious, but not better, as some think. After the corn comes up, I drop half a spoonful of plaster on each hill. I then run the cultivator over the crop, followed by hoe hands to replant, and weed only the foul spots. After this is done, I run the plough next to the corn, two furrows in each row, throwing the earth to the corn, which is now large enough to be thinned and weeded. I leave two stalks in a hill, except on very poor land, where I leave only one. Although I plant only 3 grains in a hill, I get as good a stand as my neighbors, who put in from 6 to 12 grains. If birds, insects, &c., attack a hill of a dozen stalks, they generally destroy all. I graze the land intended for corn during the previous fall to destroy the worms, and generally succeed. After the corn is thinned and hoed, and as soon as the weeds and grass begin to show themselves, I plough out the row; and this I find, in some years, to be sufficient cultivation. At other times, the grass grows faster and I find it necessary to run the cultivator through, which is an ample "lying by." Now, this is a small amount of labor, but it has succeeded well for a number of years past, producing a heavy crop for the quality of the land. I have a very coarse kind of corn, which I have named giant corn. It is a good variety for rich lands, but can be made as well as any kind on poor land. The original variety was introduced here by the late Governor Barbour. The ear is very long. I have seen them very frequently from 12 to 14 inches; and one of my neighbors told me he had raised an ear 18 inches long. The grain is white flint, heavy, and makes superior bread. I have mixed it with the gourd-seed variety, making a shorter but larger ear. I have sent you some for distribution. I sowed the wheat you sent to me on its reception, (1st December;) too late, I fear, to succeed this year. I should be pleased to get a package of spring seeds.

Bacon hams.—For many years I have been a curer of bacon hams for market. Much has been said and written on the best method of curing hams; and yet I have never seen a strictly prime ham cured anywhere else than in Virginia, between tide water and the Blue Ridge mountain.

The far-famed Smithfield ham is greatly inferior to the hams of many curers in this section. I have tried many and various plans—nearly all that I have ever seen recommended. I have tried the various brines, sugar, molasses, peppers, &c.; but have satisfied myself that the plan I have settled upon makes as good or better bacon than any of them. I take the hams of young, thrifty, and fat hogs—weighing from 100 to 175 pounds each—after they are properly cut out in a rounded form; and I sprinkle the under surface of each with a spoonful of powdered saltpetre; then I cover it thickly with a mixture—of Liverpool salt two-thirds, and ground alum salt one-third, and pack them in boxes, with the leg inclining downwards to let the salt penetrate through it. I object to brines, as giving the ham an earthy or bad flavor.

After they have laid in salt 4 or 5 weeks, I hang them up in a smoke-house, sometimes ashing them previously with hickory ashes, and commence smoking them every day with the ordinary chips of oak, hickory, &c., from the wood pile; taking care to so smother the fire as to make a great smoke with little heat. This is continued from 4 to 6 weeks, or until the bacon gets very dry and well cured, and of a dark color externally

About the 1st of March, or before the fly comes to deposite its eggs, I take the hams down, and cover each one on the flesh or inside part thickly with dry ashes. I prefer weak ashes, because they remain drier, and do not give the bacon a soapy flavor, which strong ashes will do. I then take the hams separately, and place them on shelves, arranged like the shelves of a store-house, taking care not to let one lie on another. My object is to keep them as dry as possible. The thick coat of ashes accomplishes not only that, but prevents mice, rats, and all insects from attacking the meat. It prevents, too, the absorption of moisture, or evaporation, and preserves the hams free from rancidity or any material change from keeping. Hams of this kind—of one, two, or three years old—can scarcely be distinguished from each other.

Some persons pack hams in salt, which gives them an earthy flavor, and some in ashes, which gives them a soapy taste. My hams have sustained the highest character in the Richmond market for many years past; and I have obtained the highest prices for them; and, for my own table, they are at least equal to the *inemptas dapes* of any Roman citizen.

The whole secret of making good hams consists in salting well, (using saltpetre,) smoking and drying well, and then keeping the hams dry and free from the depredations of rats, mice, and insects. My bacon never becomes rancid, which I attribute to good salting, good smoking, and dry keeping.

I am, very respectfully, yours, &c.,

WM. A. GILLESPIE.

Hon. THOMAS EWBANK,
Commissioner of Patents.

NOTTAWAY COUNTY, VIRGINIA,
November 24, 1851.

SIR: Your Circular, propounding various interrogatories connected with the agricultural interest, was received some time since, and laid aside, without any expectation of a reply—not from any want of solicitude for the success and encouragement of your Report, but from a belief that its pages might be more profitably filled by others.

I am reminded, however, by the reception of your last Report, and the large amount of most valuable information it contains, that it is the duty of every citizen, when called on, to contribute his exertions, though feeble, to the promotion of such a desirable object. The legislation of this country is so rarely employed in the advancement of the agricultural interest, (the most important of all,) that whatever is done should be nourished and cherished with the most lively concern.

I regard the Department under your supervision as one of the most important in the Government. It has been said that he who makes two blades of grass to grow where but one grew before confers more benefit on mankind than the whole race of politicians put together; but, by establishing and encouraging your Department, the politicians themselves are tributary to this most important result.

You remark that "the questions are intended rather as hints or suggestions, than to be literally followed in shaping replies; and, by extend

ing, as they do, over the agricultural products of the whole country, no one person can be expected to reply to all." I am relieved, then, from the necessity of observing any particular system or regulation in what I may write.

I may remark, in general terms, that corn, wheat, and tobacco may be regarded as the *staple crops* of this region of country. Nor can I say that, until lately, any particular interest was evinced in any improvements of cultivation, &c. We have lately formed one of the most interesting agricultural clubs in the State—meeting every month, at the house of some member, to discuss agricultural subjects. One of my enterprising neighbors has three silver cups as premiums for the largest number of subscribers procured for agricultural journals. I mention these incidents as indications of an interest and a tide of improvement which, taken at its flood, may lead on to fortune. This zeal and enterprise, I think, may be regarded, in part, as the offspring of certain facilities of transportation, &c., afforded by the internal improvements of the country; and which will, no doubt, effect some changes in the kind of crops cultivated. This interest, to which I have referred, has caused a great many experiments in different varieties of grain, &c.

Wheat.—I last year tried various kinds of wheat, and remarked, to an extensive wheat-dealer, that I had settled on the Poland and purple straw. My selection commanded his decided approbation. I think they may be now regarded as in the highest favor in this section. Still objections are urged with propriety against both. The Poland is later than desirable, and consequently more liable to rust. The purple straw is considered more obnoxious to smut; which, in some neighborhoods, has been very fatal this year, particularly to this variety. Having a manufacturing mill, I can speak with some degree of confidence and information on this point. I cannot tell why this description of wheat should be more liable to smut. Its distinguishing characteristic is, that it is made earlier than other kinds. The use of brine and lime in preparation of the seed wheat is considered a preventive. The Poland has this year, I think, exceeded in product and quality all other varieties. Its growth being taller, it is considered better adapted to poor land; and the use of guano corrects its tendency to be late.

It is very difficult to give an accurate response to the inquiry concerning the average product. My Poland (some call it Woodfin and blue stem) has this year yielded about fifteen for one sown, or about twenty bushels to the acre, being here sown on better land than usual. I should regard ten for one as over the average in this section. Guano and other fertilizers are so generally used now, and so much more attention bestowed on improvement of land, that the product has been greatly increased within the last few years. I have not used *guano* extensively, but sufficiently so to express the confident conviction that it would quadruple the product on poor land. The proportion of increase is not so great on rich land. The plan generally adopted in this section is to turn it under with a two-horse plough. Intelligent practical farmers are now preparing to harrow it in with the wheat. I consider it such a powerful stimulant that it will act well when applied in most any way, except top-dressing. It is too volatile for that. If the government would now turn its attention to a reduction in the price of this article, I should consider it, in connexion with its encouragement to your Department, as

an ample atonement for the neglect which has heretofore characterized its operations. I made an experiment which satisfied me that its effects are visible (when turned under) for four years. If you are required to make any report to Congress, I should recommend this as the chief material for it; and if you can be instrumental in effecting this reduction of price, you would deserve a monument from the farmer second only to Washington's. In connexion with the wheat crop, and your inquiry concerning improvements in machinery, I will remark that I have for two years used one of Hussey's reapers with much satisfaction and advantage. I think the saving in labor and grain will return its cost for every thousand bushels reaped. I think for a whole crop it is decidedly superior to any I have seen or heard of. Others may beat it in a trial of one hour. This machine is not liable to get out of order. It will cut about twenty acres per day, without leaving a single head standing. I could say more on this subject but for the space it would occupy.

I think the use of *steam*, particularly in threshing, grinding, &c., is likely to constitute a new and important era in agricultural operations and its incidents. I look forward to the time when steam engines will be so simple and cheap as to be considered important and almost indispensable operatives on every large farm. I have been using one as an important and valuable adjunct to water power. It is, perhaps, enough now to say, that steam and water work together in perfect harmony. I have a grist mill, flour-mill, saw-mill, and many other machines, all of which can be propelled by water power alone, or steam power alone, or combined in equal quantities, or by using more of one and less of the other. It would be useless to describe the particular *modus operandi*, as no two situations would allow the same fixtures. Suffice it to say, that nothing more is required than a band wheel on any part of the machinery allowing it, to which the band from the engine wheel may be applied; the size of these wheels to be regulated by the motion required. It is for each individual to calculate whether the nature of his operations justifies the expense of the preparation. I would not consider that a grist-mill alone would justify it, unless on the principle that the owner could afford to use the engine at a loss a small portion of the year, to enhance his custom greatly during the remainder. But it is not often that such a power is confined to a single operation; for after procuring it these addenda cost comparatively very little. Nothing but an extra band and threshing box is necessary to thresh wheat; nothing but a band and bark-mill is necessary to grind bark for a tannery; and an engine to heat the water to extract the substance of the bark, grind it, &c., is almost indispensable in every large tannery; so that, without coming in conflict with the prudent and proper injunction not to have too many irons in the fire, it may still be judicious and proper, when you have a certain power, to make it work for you as many different ways as possible, particularly where the same supervision will answer for all. Indeed, it may be important to combine several in order to justify the expense of procuring the power. I have bestowed more time on this branch of the subject, because I know of nothing more essential to the development of the resources of the country. Many a bold stream is allowed to carry its tribute to the ocean unemployed, merely because of itself it is regarded insufficient to accomplish the desired objects—a deficiency conveniently supplied by the combination discussed. I have already suggested that the government,

acting in its appropriate sphere, could do nothing more in aid of the neglected interest of agriculture than the encouragement of your department, and the reduction in the price of guano. If anything could be done effecting the cheap introduction of steam into our agricultural operations, such as grinding corn, threshing wheat, sawing plank, &c., I should regard the measure of agricultural importunity and aspiration as completely filled. There is a comfortable degree of humanity in conducting arduous and laborious avocations without the exhaustion of animal muscle.

I have occupied so much space on other topics, that, if I refer at all to the other subjects of your inquiries, it must be summarily.

Corn Crop.—In reference to the corn crop, I think the saving of the largest double ears important, whatever may be the kind. There is no favorite species that I am aware of in this region; the product is very variable. We regard 10 bushels to the acre, without improvement, as a fair product.

Tobacco.—In reference to tobacco, I believe that he who could cause *one* plant to grow where two now grow, would confer almost as much service as he who could double the blades of grass. I mean, by this, that the vast amount of labor employed in its cultivation can be more profitably employed on other operations, and that a country is more benefited by the productive articles essential to the sustenance of animal life than those tributary to its destruction.

Stock.—In reference to your inquiries about stock, I would recommend for improvement, Cotswold sheep, Chester hogs, and a cross of Durham cattle, having tried all these kinds, and some others. There are many other "topics of universal interest to the agriculturist" suggested by your Circular. I fear, however, that the length of my response has already caused you to regret the application made to me.

Oats.—Oats cannot now be regarded as one of our market staples, though the cultivation is extensive for domestic use. The most valuable variety I have tried is the Prince Edward Island.

Rye.—The *multicole rye* has been recently introduced into this section of the country—I think, with satisfactory results. That description formerly cultivated frequently failed to produce grain. I have cultivated the different varieties in parallel rows, and found the product of the multicole more than double. It is later than other kinds, and has more time to form the grain; there is no other perceptible difference. I think it should be the policy of our country to encourage as much as possible those crops which require little or no cultivation between seed time and harvest, the effect being to save labor, improve land, promote the growth of grasses, the abundance of stock, &c. I have been influenced in the response I have made to your inquiries by a disposition to evince my appreciation of the Department under your supervision, regarding it as the harbinger of a brighter era and interest in the agricultural enterprises of the country.

Most respectfully,

EDWIN G. BOOTH.

NORTH CAROLINA.

LINCOLNTON, LINCOLN COUNTY, NORTH CAROLINA,
January 10, 1852.

SIR: I received one of your Patent Office Reports some days ago with great pleasure, as it contains some excellent information. I will give a few remarks on the culture of our crops:

Wheat.—Wheat is becoming the most profitable, but is mostly too carelessly put in. After the corn is gathered in October, the wheat is sown broadcast on the stock-ground. The average yield is from 4 to 10 bushels to the acre, and it is a good season in which we get that much. If we would sow more clover and grasses, use more fertilizing manures, plough from eight to twelve inches in July and August, and spread from twenty-five to thirty loads of fertilizing manure to the acre, we could raise from 50 to 75 bushels of corn to the acre; but alas! every farmer tries to see how much land he can tend; and behold, when autumn comes, it brings him but a small yield. Were he to spend one-third of his labor in making manure, and till less land, he would make double the grain; and plough eight or ten inches deep instead of running over so much land, and only ploughing two or three inches; then, when a good shower of rain comes on, it washes all his little loose earth away, and leaves his hill-sides bare. By breaking up his land with a good subsoil plough, (one of Nourse's eagle ploughs,) from ten to fifteen inches deep, it would absorb all the rain, and stand the drought much better. We raise no stock of any kind except for home consumption, and not half enough of that; for we have now worn out our lands so much, that we do not grow food enough to maintain them. I would rejoice to see the time when all the farmers of old Lincoln shall see the benefit of manure, and hope the day is not far distant when this shall be with them a leading interest.

I will thankfully receive any good variety of corn from the Office, should there be any, as I wish to make some experiments on some new kinds of corn, if it is but three or four grains; also shall be very thankful to receive any Reports from the Office.

Yours, respectfully,
G. S. SULLIVAN.

WELCH'S MILLS P. O., CABARRAS CO., N. C.,
December 31, 1851.

SIR: I received your Patent Office Report for 1850; also, your kind favor of Troy wheat came to hand on the 12th instant, which I seeded next day on good ground, but, I fear, too late for a fair trial; but I hope I shall be able to send you a report of it in my next.

Wheat.—The crop this year was fine with those who sowed the May wheat. No rust or fly troubles this kind of wheat—nothing but the late frost in spring; that sometimes cuts its down. We have to sow in November, and sometimes as late as December. I sowed 7½ bushels, and had 125. Time of harvest, 28th, 29th, and 30th of May; weight of wheat, 65 pounds; flour, good. Burr-mills now in use, that make as

good flour as any in the Union; price, $1 per bushel; average yield, 10 bushels per acre. Our people are so engaged with raising cotton, that there is no improvement making in the wheat crops. They are so taken up in gathering cotton, that they do not sow wheat at the proper time to make a good crop.

Corn.—A very light crop has been raised this year. The drought has been so fatal to the corn crop, that there will be a general scarcity, and the price is at present 75 and 80 cents per bushel. I would say it is very far below an average crop—say about 15 bushels per acre, and a failure in every direction—as much so as in 1845. We are thankful for what little we have.

Cotton.—This crop this year has been about 600 pounds per acre. Cotton has been at a low price this winter—say from $7 to $8—a price that farmers can scarcely live at; but it is the great crop of this region. Upon it the planters depend for their money. Indeed, many of our farmers aim at nothing else to make money until they run out their ground, and are obliged to throw it out. But there is great improvement making in raising cotton; it is the only article to bring the cash. The staple was very good this year, and commanded as high a price as the South Carolina cotton. The cotton crop this year was backward by the spring being cold. In May and June it grew off finely; in July there came a drought, that checked the growth of the stalk, and finally stopped the growth of the cotton; short crops.

Oats, for the past year, were very light, owing to the drought; not half a crop that makes seed. Oats are scarce and dear.

Barley is but little cultivated in this region of country, although it turns out well, and would be well worth attending to. It makes excellent feed for horses; but the good land is all planted in cotton, and the barley left out.

Rye receives but little attention; very little raised in this section of country; left out to plant cotton.

Clover and Grasses.—Little has been made in the last two seasons; the drought having been so severe.

Negroes hire this year at $100 and $130 to work on the North Carolina and Central railroad, from Charlotte to Goldsborough.

Your humble servant,

JOSHUA HARRIS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

SOUTH CAROLINA.

MATANZA, PEE DEE, *January* 7, 1852.

SIR: The season for rice in 1851 was good, with the exception of the high winds in July and August.

Herewith I transmit a statement of meteorological observations for the year, as kept by our excellent neighbor and friend, the reverend rector of the parish in which my former residence is found—showing that 46.53

inches was the quantity of rain during the year; that during the crop season there were seventy days in which it rained more or less, namely, in the month of April nine (9) days, in May five (5) days, in June fourteen (14) days, in July seventeen (17) days, in August twelve (12) days, in September seven (7) days, and in October six (6) days—measuring, in the aggregate, thirty three and one-third inches, (33⅓.) It is true that in the long rivers (the Pee Dee and the Santee) there was a freshet in the month of March; but this only impeded those planters who were not duly advanced in the preparation of the soil; otherwise it it was rather an advantage. As an evidence, it left a deposite uniformly distributed, which is one of the best dressings the land can have.

The tides fell out well in June. After "long water" the fields were clean, and the promise of a full crop was very fair in this part of the country. Late in July, however, when the most forward rice was in bloom, we were visited by a gale which destroyed all the blossoms then out.

The morning after, up to 8 o'clock, in some fields of my own (Waterford) there were no blossoms to be seen. By 11 o'clock the plants were covered with new blossoms, as if nothing had happened; but there were parts of the ear the pistils to which were dried up, and could no more be fructified by the pollen from the new blossoms. In every such instance the chaff is all that remains of the grain. In this way the product has been materially diminished of fields which, to the general observer, still looked promising. On the 24th of August another gale visited the coast from southeast, still more severe. The rice crop was then more generally in bloom; of course the damage was more general and severe, and the plant was affected in the same way as described above for the month of July. In addition, where there was very late rice, which happened to be then just in "tight barrel," by the violence of the wind, the barrel was prematurely burst, the incomplete ear exposed, and in many instances the topmost grains were blasted. Owing to these causes, the crop in this district will barely be an average one. The harvest weather, happily, was fine, and the rice has been well cured. South of the Santees it is understood that the crop on several rivers has been diminished by the effects of salt water. On the whole, I cannot estimate the crop last harvested, and now going to market, to be as full as the one preceding it. In January last I ventured to estimate the crop of 1850–'51 as likely to prove ten per cent. short of that of the previous year.

The following is a statement of that crop, as derived from a commercial friend in the city of Charleston, to wit:

	Barrels.
Total receipts of rice for the year ending September 1, 1851	138,523
Less stock on September 1, 1850	1,555
Net receipts	136,968
Of this there were exported—	
To Great Britain	14,115
To France	5,129
To North Europe	22,136

	Barrels.
To South Europe	697
To West Indies	18,967
Foreign	61,044
Coastwise	64,075
Total export	125,119
City consumption	11,620
Destroyed by fire	310
Stock on hand September 1, 1851	1,474
	138,523

Of this were exported in the rough—

	Bushels.	
To Great Britain	223,017	
To France	21,247	
To North Europe	138,133	
Total foreign	382,397	Allow 21 bush. to bbl. or 18,209 barrels.
Total coastwise	61,351	or 2,921 "
Total rough rice	443,748	or 21,130 "

The long-grain rice, when prime and well prepared, is still preferred by very choice purchasers. Up to the present time, several sales have been completed of this variety, at $3 87½ per hundred weight, and two small ones at $4 and $4 25, respectively, when the market for prime of the small grain usually cultivated ranged from $3 to $3 50 per hundred weight.

Very respectfully,

ROBERT F. W. ALLSTON.

GEORGIA.

CLARKESVILLE, HABERSHAM COUNTY, GA.,
December 17, 1851.

SIR: Your Circular of interrogatories was handed to me to answer by the postmaster of this place.

I have called to my assistance Dr. George D. Phillips, who has long been a visitant of this county, and whose general experience and knowledge of several subjects of inquiry better qualify him to answer them than myself; and I give his answers entire in relation to corn, oats, barley, &c.; dairy husbandry; neat cattle; horses and mules; sheep and wool; hogs; rice, tobacco, hemp, and root crops; which are, without doubt, as near correct as it is possible to make them under present circumstances.

Wheat.—No guano has been used for any purpose in this county. The yield per acre is probably about ten bushels; time of sowing, from the 15th September to the 1st December; time of harvesting, from the

15th June to 15th July; seed generally soaked in sulphate of copper to prevent smut; which process appears to prevent it almost uniformly. Our farmers usually sow about one bushel to the acre. Wheat is usually sown amongst the standing corn, or on land which has produced a crop of corn, and ploughed in with an ordinary southern plough. The best remedy for the Hessian fly that we are acquainted with is either to kill all the grass on the land before sowing or to sow late in the season—say middle to the last of October. Exposing the wheat from time to time in the open air and sunshine eradicates the weevil. The culture of wheat is conducted very carelessly and in a very slovenly manner. Should our farmers prepare their ground with as much care as is done in the States of New York and Pennsylvania, the yield would, without doubt, be as great as it is in those States.

The greater portion of the crop is consumed within the county, and is worth about $1 per bushel.

Corn.—The manures used for the corn crop are made in the stable, cow yards, and hog-pens, by littering them freely with forest leaves, straw, &c. These are applied to the soil broadcast, or spread in the spring, previous to ploughing, and turned under by a one-horse turning-plough; two would do better. The land is then laid off by ridging, with three furrows; crossed at right angles by one furrow, and planted. This is the common way of preparation and planting in upper Georgia, both on the uplands and bottoms; but our best and most successful planters plant mainly in the drill, and plough but one way; having protected their lands from washing by water furrows, or hill-side ditches.

On all lands we plough deep, particularly at the first and second ploughings. The old method of hilling corn is generally abandoned. We consider the best way in which corn can be fed to animals is in the form of meal, and the finer the better; and that it is more easily digested and nutritive, when cooked, for hogs and cattle, we fully believe.

We have no doubt but the manure resulting from ten bushels of corn, fed to hogs, if applied to an acre of land not too much worn, would increase the product one-fifth.

Oats, Barley, Rye, Peas, and Beans.—We have cultivated, to some extent, for many years, oats, barley, rye, peas, and beans; and consider them as *exhausters*, in the order in which the first three stand, but do not regard peas and beans as exhausters, provided the vines are not removed from the land; if ploughed in, more is returned to the soil than is abstracted from it.

The average yield of oats and barley is about 12 bushels per acre; rye, 8 bushels; peas, from 15 to 18 bushels; beans, say 12 bushels.

Much depends upon the sason as to the last two crops, an early frost cutting them off short. Very few have cultivated peas as a renovating crop in this county; those that have done so find it equal to a crop of green clover when turned under.

Clover and Grasses.—Clover has been somewhat cultivated, for a few years past, and will, doubtless, be more extensively used in a few years; if properly cultivated, will yield about 4 tons per acre, and gives three mowings in a season. No fertilizers are used for meadows, except lime; and that to a small extent. Herdsgrass-seed (red-top of the North) is preferred in laying down meadows. Two bushels per acre is about the

usual quantity of seed sown. The cost of growing and curing hay is, probably, about $4 per ton.

Dairy Husbandry.—So little attention is paid to dairy husbandry in northeastern Georgia, that our information is meagre. Only one individual, within our knowledge, has engaged in cheese-making; and, though he had extensive pasturage for cattle, and milked about 100 cows, he abandoned it at the end of the second year. He is a northern man, had some experience in the business, made fine cheese, which met with ready market; and, if it had been more profitable than other pursuits, would doubtless have continued it. Every farmer keeps as many cattle as he can carry through the winter, and makes his own supply of butter, at a trifling cost, and sells any surplus at 10 cents per pound.

Neat Cattle.—The cost of raising cattle with us is trifling. In summer they feed on our native grasses, and in winter on corn-husks, straw, pea vines, and hay. At 3 years old they cost us in value of labor in feeding, &c., $3 50 per head, and are worth about $7. A good cow is worth $12 in the spring, and $10 in the fall.

What would be the increase in weight from feeding 100 pounds of corn, would depend on many circumstances—the tendency to take on fat, the condition of the animal, &c.; but that it would not ordinarily fall short of 15 pounds if ground into meal, we fully believe. We have neither the pure blood nor crosses of the Devon or Hereford cattle; but our native breeds are as thrifty, and take on fat as readily as the Durhams. We break steers by securing them to a post or tree, where they are fed and watered until they can be handled safely, and then put them under the yoke with one older and well broken; work a pair alternately this way for a few days, when they will be sufficiently broken to work ogether or separately.

Horses and Mules.—We find horse and mule-raising profitable; particularly the latter, as the cost of raising a mule until he is fit for use and market, (say 3 years old,) does not exceed $30. That of the horse colt, at the same age, is not less than $50. Our brood mares do the work of the farm until they are near foaling, when they are more cared for, and taken from work. Two or three weeks after foaling, they are put to work again and highly fed; when at work, the colt follows or runs about the field, doing but little damage. The greatest difficulty in breaking a mule is to get him harnessed, and in place in the wagon. They never refuse to pull, and any simple contrivance, by which they are prevented from throwing down their head, will prevent their kicking. A few days' steady work will break either horse or mule when he cannot throw his head down.

Sheep and Wool.—We neither raise wool nor mutton sufficient for our own use, although we are in the finest sheep-raising region of the south; where, for 9 months in the year, they keep fat on the native wild grasses. The life of the animal has no protectio from man or dogs, and the latter eat more mutton than the former.

Wool from our native breeds could be raised for 8 cents per pound, and we know no reason why there should be a difference in the cost of raising ordinary and fine wool. Those who attend to their flocks properly, raise 18 out of every 20 lambs.

Hogs.—Our best breeds of hogs are thought to be a cross of the grazier and Woburn; but some prefer the smaller hogs, crossing the grazier

and Chinese Guinea. The cheapest way to produce pork, is to keep the pig fat, the shoat fat, and the hog fat, and kill at 14 or 18 months old. Have lots of barley for young hogs to feed on in winter, clover lots, with the gleanings of wheat fields in summer, and peas, pumpkins, and apples in autumn. But to fit the hog for bacon, there can be no substitute for corn.

Rice.—That rice can be successfully cultivated on upland we know, as several of my friends have raised it, at the rate of 40 bushels to the acre. Two varieties have been tried, with equal success.

Tobacco.—But little tobacco is raised in upper Georgia, where the climate and soil point it out as a market crop. Eight hundred pounds per acre is regarded as the average crop; and the best rotation crop to be wheat. The cost of production cannot vary much from $3 per hogshead.

Hemp.—We raise no hemp, and but little attention is paid to the root crops.

Potatoes.—Both Irish and sweet potatoes are cultivated for home consumption. The average yield is ordinarily about 350 to 400 bushels per acre. The cost of production does not exceed 10 cents per bushel. Very little preference is given to varieties. Planting in hills is preferable to ridges, and is usually pursued, as it exposes the roots to the more direct action of the solar heat. Long manures, such as straw and leaves, are preferred for Irish potatoes; and that from the cow-yards for the sweet. The potato rot has scarcely made its appearance with us. Some four or five years since a little of it was to be seen. Of late, however, it has entirely disappeared, and our crops are as sound and healthy as they were before the appearance at the North of the disease.

Fruits.—The interest manifested of late in the cultivation of fruit is decidedly on the increase in this county, which is peculiarly adapted, both in soil and climate, to its successful culture. There is now a greater variety of apples and pears cultivated in this county than in all the rest of the State together. Not less than 150 or 200 varieties of apples, both northern and southern, are cultivated, with every promise of success. Nearly the same number of pears are, also, either bearing or in progress of growth, which promise well. Southern-raised trees succeed much better, and come into bearing sooner, and are more durable, than those imported from northern nurseries, which receive a very material check from the length of time it takes them to reach us, as well as that they receive before they become acclimated.

The apple crop can, most undoubtedly, be made one of the most profitable, if not more profitable than any other crop that can be grown here. The best keeping varieties we have of the northern are, the Esopus Spitzenberg, Newtown pippin, and northern spy; of southern, the berry, wonder, buff, and English crabs, as they are here called. The best remedy for the blight we find to be root-pruning, as the disease is caused by a too luxuriant growth of wood, which is left in an immature state when winter sets in.

Peaches grow here almost indigenously. No care is bestowed upon them, as the trees spring up everywhere, and produce enormous crops, without pains. We grow them here weighing over one pound each, and of as fine flavor as are to be found anywhere.

We cannot succeed in raising the smooth-skinned fruits—such as nec-

tarines, plums, and apricots—from the ravages of that insect pest, the curculio.

The splitting of the trunks of the finer cherry trees, when two or three years old, from the bud, is a malady for which we have not yet found a remedy, and which pretty effectually prevents their extensive cultivation.

Grapes do admirably with us, both native and foreign varieties. Occasionally the rot attacks them, when suffered to grow too luxuriantly, and bear too great a crop. They require constant pruning during the growth of the crop, and high manuring with vegetable manure and ashes. Swamp soil, with ashes, is one of a most desirable character.

No wine is made.

I have never seen a case of *yellows* amongst our peach trees.

Manures.—Very little attention is paid to making and preserving manures. The best plan, beyond question, for preserving and making manures effective is to keep them from the weather; and, when applied to the land, to be immediately ploughed in.

Lime is beginning to be used as a fertilizer, with very evident advantage, and in quantity of from 25 to 100 bushels to the acre, according to the character of the land on which it is put—that containing the greater amount of vegetable matter receiving the greater amount of lime.

Not an ounce of guano has found its way to this county that we are aware of.

J. VAN BUREN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

HAMILTON, HARRIS COUNTY, GEORGIA, 1851.

SIR: I send you what little information I have in agriculture upon such articles as are generally raised in this section.

Wheat.—Guano is not used in this county in the production of wheat. Cotton seed is the principal manure used here for raising wheat. One hundred bushels per acre of cotton seed will generally make the yield double. Land that will bring five bushels per acre without cotton seed, will generally yield ten bushels by applying the cotton seed in the above proportion. The best time for sowing wheat in this section is about the 20th of October, if the ground is not wet. Wheat does best sown when the ground is dry. Wheat soaked 24 hours before sowing, in bluestone, will prevent the smut. The average price of wheat in our market is $1 per bushel; cotton seed from $2\frac{1}{2}$ to 3 cents per bushel.

Corn.—Guano is not used in the production of crops of any kind in this section. Cotton seed, stable manure, and cow-pen and hog-pen manure, are used here for producing corn. The best plan of manuring corn, is to put the manure around the corn immediately after it comes up then it will be where the spur roots will strike out into the manure in earing-time. The average price of corn this year has been about 85 cents per bushel. To feed hogs with, corn does best cooked; for horses, ground and raw.

Oats.—Oats generally yield from 10 to 12 bushels per acre. They exhaust the land as badly, or worse, than a crop of corn; price, 50 cents per bushel; one bushel of seed per acre.

Rye.—The general yield of rye is from 8 to 10 bushels per acre; does not exhaust the land as badly as oats; price $1 per bushel; 1 bushel of seed per acre.

Peas.—The average crop of peas is about 5 bushels per acre; half bushel of seed per acre; market price $1 per bushel. Peas are not cultivated as a renovating crop, though they are an advantage to the land to raise a crop for stock.

Dairy.—A good cow will yield 75 pounds of butter per year; price, 15 cents per pound; cost of feeding, $5 per year. To save cream, milk ought to be put up into wide shallow pans, well scalded before the milk is put in—churned in a stone jar. To put up butter for market, the water must all be worked out; then salted down about six days; then taken up and all the water worked out again; then salt it down with fine salt, and it will keep.

Hogs.—The best breeds for the climate are the Woburn and Grazier. To save good bacon, let your pork lie after it is cut up until it is quite cold to the bone; then put plenty of salt, and about half a pound of saltpetre, to 1,000 pounds; let it lie in pickle five weeks; then take it up, wash it clean of salt; then ash it all over, and hang it up and smoke it; take it down again the first of March and ash it again, and it will keep good all summer.

Irish Potatoes.—The best plan for producing Irish potatoes, is to have the land well broken and bedded. Open the bed with a shovel plough; then drop the potato; then fill up the trench with well-rotted stable manure; then draw up a little dirt on the manure; then cover the whole surface over about ten inches deep with straw—and they will yield about 125 bushels per acre, without any further cultivation. The yellow potato is the best; the cost is so small that it is not worth counting; the average price is about $2 per bushel.

Sweet Potatoes.—The yam potato is the best of the sweet kind. The land should not be very highly manured for potatoes, or they will go to vine too much. Good new sandy land will yield 200 bushels per acre, worth 25 cents per bushel; cost of raising too small to count.

A. F. JOHNSTON, *P. M.*

NEAR BLAKELEY, EARLY COUNTY, GEORGIA,
December 10, 1851.

SIR: In reply to certain inquiries contained in your Circular for 1851, I now offer such information as experience and observation have placed at my command. Promising that all statements made in this communication are derived from the agricultural operations of southwestern Georgia, I offer none but such as I deem undeniably true. My own plantation lies about the middle of the 32d degree of north latitude, but the same practices and similar results obtain throughout this southern section of the State.

Indian Corn is made usually in abundance for domestic consumption; little or none for exportation. The production of this grain ranges, according to soil, seasons, and skill in cultivation, from 10 to 40 bushels

per acre; and the price, when saleable at all, varies from 50 cents oneto dollar; the latter price never obtains unless cotton sells high and, unfavorable seasons have curtailed the grain crop.

Cotton, the well-known staple of the country, is grown by almost every tiller of the soil, and is relied on as the chief source of income. Two descriptions of cotton are known to commercial men and to manufacturers, "the long and short staple," the latter being that which is grown on the highlands, the former on the sea islands of Georgia, South Carolina, and other maritime localities. The long staple plants grow, indeed, on highlands as much as 100 miles above the water, but the short staple is found to yield a better profit to the upland planter. The production of clean cotton-wool per acre depends greatly on soil and seasons; and the average in a term of seven years, throughout the highland districts, cannot justly be set down as more than 250 pounds. Soils of a rich sandy quality, under propitious seasons, yield double this quantity or more of clean merchantable cotton, whilst many poorer fields fall short of this average by 50 or 100 pounds. It is not an easy calculation to determine the *cost* of producing a hundred-weight of cotton-wool; but as the inquiry has been specially made, I have taken pains, aided by several of my neighbors, to attain the nearest approximation, and have come to the conclusion that the cost of production and conveyance to the nearest market does not fall short much, if anything, of six dollars and six cents a bale. This calculation proves what all cotton planters know, that disastrous seasons or low prices leave them with very scanty profits. A continuance of low prices will unquestionably drive cotton planters to the use of machinery, by which they can convert the raw material into yarn or cloth, (what should long since have been done,) by which their labor can be fairly remunerated.

Wheat, Rye, and Barley might be profitably grown in any part of this country; but they are crops of not even secondary consideration, and are consequently put on poor fields with but little care or skill.

Wheat is, of late, engaging more attention than formerly. On a meadow soil, sown early in the fall, it escapes *rust* and produces from 6 to 12 bushels per acre. The day is probably not distant when planters will generally find it better to produce flour for domestic use than to import it from New Orleans or New York.

Peas and Potatoes of every variety are successfully grown in this country, chiefly for the purpose of fattening hogs and other plantation stock. They are, indeed, especially the latter, used as esculents for the master as well as his slaves; and both, to a considerable extent, are lef in the fields to be eaten by hogs, cattle, and horses; the potatoes to be rooted up and devoured by hogs, and the peas to be consumed during the fall and winter months by every sort of farm animal. I do not know a farmer who has ever measured his ground and crop of either potatoes or peas, for the purpose of ascertaining the exact production per acre; but the current estimate of my own neighborhood is 10 to 20 bushels of peas, and from 100 to 200 bushels of potatoes. Both certainly grow well in this section of Georgia, and, as provision crops, rank next to Indian corn.

Rice and Sugar-cane.—These belong to the class of small crops, and are rarely grown for sale. An acre of wet or dry land will produce from 30 to 70 bushels of rough rice, double as much as any small family would need for domestic use; and two or three acres of high dry land, fertilized by proper manures, planted in canes, will yield as much saccharine

matter, in the form of either sugar or sirup, as the master's family and 50 negroes will make use of in 12 months. Both the crops are very common in southwest Georgia, but seldom produced in quantities beyond the requirements of the plantations where grown.

Horses, Cattle, Hogs, and Sheep.—All these animals are cheaply raised, and, if of improved breeds, would probably compete with any in the United States. The care and skill in feeding and general management are by no means such as prevail in Pennsylvania, and such as would prevail here, but for the all-absorbing cotton crop. We raise some good horses for the saddle and harness, and generally hogs enough to allow rations to the laborers at the rate of 3½ pounds of good bacon or pork per week to each field-hand through the year. It must be admitted, however, to the discredit of our husbandmen, that more than half of our horses and mules are bought from the western drover, and, when the price of cotton is high, a considerable part of the bacon and pork consumed in the country.

Cattle and sheep are left to shift for themselves in the woods, except two or three months of winter, when they receive a daily allowance of corn shocks or other coarse fodder.

In the summer they become fat on the native grasses of the forest, and milch cows, after June, when our wheat, oats, and other winter crops are harvested, yield an abundance of milk and butter from the crop or crab-grass pastures of these fields. Poor lands in this latitude produce this fine grass in great abundance after the wheat or oat crop has been removed.

During the winter months milch cows are fed on pumpkins, sweet potatoes, cornmeal, cut-straw, &c., generally in an uncooked state. In this part of the country neither hogs, cattle, nor other farm animals, have their food prepared by boiling or steam: at any rate, the practice is very rare, but will, doubtless, become more common when we shall have made better progress in arts of domestic economy.

Very respectfully, yours, most obediently,

J. CRAWFORD.

FLORIDA.

CLIFTON, MADISON COUNTY, FLORIDA,
December 3, 1851.

SIR: I shall reply to the inquiries of your Agricultural Circular in the order in which they stand.

Wheat.—There is so little attention paid to this crop, as scarcely to be called a crop with us. Very little sown; and that little most wretchedly scratched in at one ploughing—if ploughing it may be called.

Corn.—Guano is not used in our county as a manure for any crop. The best mode of planting is by throwing out into beds, as for cotton. Land ploughed deep and close; plant in water-furrow—a protection from drought; and plough the first time deep and close, with narrow, long plough; second time, less deep, with larger plough; third time, shallow, and lay by with sweep. Product, 20 to 30 bushels per acre.

Oats, Barley, Rye, Peas, Beans.—Oats, barley, and peas will yield nearly the same; rye less than either. Beans are never cultivated as a field-crop with us. Barley requires rich land to succeed in our climate. As a renovating crop, the pea is esteemed. Oats are regarded as doubtful, if not injurious.

Clover and Grasses.—These are blank subjects with us. There is some hay made from the native grasses in the fields after the staple crop is made, which comprises all to be said on this head.

Dairy Husbandry.—Blank again.

Neat Cattle.—We have none but native stocks; and the cost of rearing amounts to the labor of marking and branding the calf. If it lives, well; if not, well. On the frontiers, where the range is good, this is a most lucrative business, and a capital in stock-cattle will pay 25 per cent.

Horses and Mules.—The raising of colts is not regarded as profitable, owing to losses from staggers. Mules are, I think, as profitable as cotton-growing, the cost at three years old not exceeding $25. The mares will pay their expenses by ploughing the crop season, and giving them the fall to bring their colts. I break all my colts and mules to the wagon, working them enough to make them manageable elsewhere, and work lightly for the first year.

Sheep and Wool.—The growing of wool could not be otherwise than profitable, requiring no feed for the sheep, winter or summer, and only to be protected from dogs, wolves, &c.

Hogs.—There are various opinions as to the best breeds, these opinions depending on the way stock is raised. For the range or shift-for-yourself system, the long-nosed Pike stands A No. 1. For a system of partial feeding, the Corbet, grass, and a cross with the China hog, is preferred.

Cotton.—The average yield per acre, for all lands and years, I would not put higher than 800 pounds. The cost of production, ready in market, I think not less than say 4½ cents per pound. I know no preventive for rust, army, and boll-worm; and I think the only remedy is planting less deep, and thorough tilth, and ample manuring. I have no experience in subsoiling for cotton, but have every confidence in it. Cotton seed is beginning to be much appreciated as a manure for all crops—like the negro's 'possum, good for everything. Cotton lands can only be improved by rest and manure.

Sugar-cane is with us only a patch-crop for home use, and does not succeed well, from the rattoon, more than one year.

Rice is grown successfully upon all lands in our climate, particularly fresh. Product, from 30 to 60 bushels rough rice per acre.

Tobacco.—None grown, except for home use. The Spanish or Cuba tobacco is profitable when carefully handled.

Hemp.—None grown.

Root Crops.—Only grown as family comforts.

Potatoes are grown (the sweet) by every one. Negro-killer, or Alabama, and Hayti, the most productive. The best system of planting, is deep and thorough tilth, the lands drawn into beds, and the least work possible to keep the grass under afterwards.

Fruit Culture.—Almost wholly neglected. The orange is now receiving some attention. Some grapes, for table use. Almost all kinds of fruit would, no doubt, succeed, with proper attention.

Manures.—Owing to the freshness and natural fertility of our soils, with the mildness of the climate, and the great ease with which the comforts of life are obtained, we have hitherto almost entirely neglected manuring, except with cotton seed.

Respectfully,

RICHARD J. MAYS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

MANITOU RIVER, TAMPA BAY, SOUTH FLORIDA,
December 18, 1851.

SIR: I have received your "Agricultural Circular," and, as requested, will answer some of the questions asked, giving such information as I possess; and being a sugar planter, I shall confine myself chiefly to a description of that staple—its history and culture in this State. The cane cultivated in this State has been brought originally from Georgia, having extended gradually south, from the Carolinas, keeping pace with the advancing civilization, and becoming more developed, as it approached the tropics. With us it is more perfect than in any other territory of the Union, annually arriving at maturity, tasselling, and bearing seeds: these seeds are exceedingly minute, and it is generally supposed that they are inadequate to the reproduction of the cane. I think, that in consequence of the annual maturity of our cane, its vitality is progressive, furnishing a perfect and healthy plant; such is not the case in Louisiana. Their imperfect plants, propagated year after year from the refuse of their unripe cane, may reasonably be expected to lose their force and decay. The culture of the sugar cane, on the large scale, is comparatively of recent date in Florida; our experience and knowledge of its culture are consequently imperfect. In South Florida, we find that our canes will rattoon well for five years; but I believe that the conviction is general, that we should not rattoon longer than three years; which, with the first or plant crop, makes a term of four years between each planting. The establishment of sugar plantations in South Florida is so recent, that no planter has succeeded in getting in a full crop. Consequently, no well digested system of rotation has been adopted. The system which I am adopting is, to divide my plantation into five equal portions, four-fifths of which will be planted in cane—the fifth to lie fallow. During the seasons of leisure, this portion will be prepared in the best possible manner for planting in the ensuing spring. My lands are based on marl, having a rich subsoil, but a light silicious surface soil. The fallow land will be ploughed very deep, with four-horse ploughs, throwing it up into lands of seven feet, with deep water-furrows; into these furrows all the trash of the land, and the rotted begassa of a preceding crop, together with any other manure which may have been prepared, will be collected. The land will be again ploughed with four-horse ploughs, bedding on the deposited manure; when this fifth is planted in cane, the oldest of the remaining sections will be ploughed out, and subjected to the same operation. By this system, our plantations will yield from 2,000 to 3,000 pounds of sugar to the acre. Nothing is

more injurious to a rattoon crop than the method often pursued of burning off the refuse trash, &c., unless it be the introduction of cattle.

Very few planters return their begassa to the land on which it grew. In Louisiana vast chimneys are constructed, at great expense, for the purpose of burning it; when this is not done, it is generally hauled to the river, and dumped in. These planters do not reflect that they are removing from their lands those essential salts, without which it is impossible to produce a good cane, and of which there is only a limited quantity in any soil. The begassa from every acre of tolerably good cane contains, of

	Pounds.
Silica	138.01
Phosphoric acid	11.28
Sulphuric acid	19.98
Lime	27.48
Magnesia	10.98
Potash	76.50
Chloride of potassium	9.81
Sodium	6.06
Total	300.00

In every good cane, this amount is doubled. Those who pursue this insane mode, may probably find in it a sufficient cause for the loss of that vital force of which they complain. I think, that on a fully developed plantation the cost of production of sugar, in South Florida, will be from 1 to 1½ cent per pound, dependent upon the variation of seasons.

Rice can be grown very profitably, on the small scale, on our high lands in all parts of the State; 60 and 70 bushels being not unfrequently gathered from acres carefully prepared. The yellow or golden rice is, I believe, best adapted to either wet or dry culture. My own experience is limited to the culture of high-land rice on my new grounds, as a preparatory crop to cane. This, on the large scale, is not profitable. There are large bodies of land along our Gulf coast, admirably adapted to the cultivation of this staple. It occurs to me that the area of rice culture could be very much extended by the introduction of the wheel commonly used for drainage, reversing its operation, and throwing the water on the lands too much elevated to use the natural flow of the stream. Some of the machines are in operation in Louisiana, which throw several millions of gallons per hour. Many old fields, abandoned in consequence of the difficulty of procuring a proper head of water, might thus be reclaimed.

The *fruit culture* of my immediate district is confined to the production of oranges, lemons, limes, guavas, bananas, pine-apples, cocoanuts, &c., &c. Of these our plantations are small, and young; but they have given ample earnest of profitable results. On the hummock lands we can realize from 300 to 400 barrels of oranges, lemons, and olives to the acre. Our pine lands will, with proper attention, give 200 barrels per acre. I have a few olives, from which I expect fruit next year. I have many varieties of wild grapes; some of them very superior, hanging in large and heavy clusters, both purple and white, resembling in appearance some of our finest cultivated grapes.

The Bermuda arrow-root flourishes throughout South Florida, producing even on the pine lands from 200 to 300 bushels to the acre; the quantity being largely increased when planted on rich lands. The yield of merchantable arrow-root flour, obtained by very imperfect mills, is from 6 to 8 pounds to the bushel; worth from 25 to 30 cents per pound. Along our Atlantic coast, south of 27°, the cumpti or Indian arrow-root grows spontaneously, giving results nearly equal to that of Bermuda, with the advantage that it requires no cultivation—the sole labor consisting in bringing it from the forest lands, and conveying it to the mill; the simple stirring occasioned by the digging being sufficient to secure a better crop than the one just removed. The Sisal hemp grows readily and luxuriantly, even upon our thin pine lands, and will eventually become a valuable staple; but, in the multitude of others, it is at present overlooked. So, also, the palma christi, which becomes a tree, and is perennial.

Our country is well adapted to the raising of *horses and mules;* our climate affording perennial pastures, and rendering unnecessary expensive provision of forage and stabling; as many of these animals as might be required for the use of the country could be raised to the age of three years without requiring the expenditure of as many dollars. The healthfulness of these animals, in our section of the country, is notorious. Colts should be broken before they are weaned. Being early accustomed to the bridle and gear, the transition from freedom to labor is imperceptible.

Very respectfully, your obedient servant,

ROBERT GAMBLE, Jr.

Hon. THOMAS EWBANK,
Commissioner U. S. Patent Office.

ALABAMA.

BOLIVAR, JACKSON COUNTY, ALA.,
October 29, 1851.

SIR: Your "Agricultural Circular," United States Patent Office, of August, 1851, has been by me duly received; and I now readily proceed to give you such information and suggestions as I have on hand.

Corn.—This crop is grown in this part of the State in great abundance generally. The drought has injured the last two crops considerably, both in quantity and quality. Neither guano nor any kind of manure is used here, to any extent, in the production of this crop. However, the time has come when our farmers that cultivate up or barren lands will have to resort to this process, or emigrate, as has heretofore been the practice. The application of fertilizers even now pays well. The average product per acre is from 35 to 37 bushels, at a cost of about 25 cents per bushel.

The best system of culture is not generally practised here, our lands being rich, and the product of little value over home consumption. Now we have the dawn of better times, a market being opened for our surplus.

I will state an experiment I made this season in the cultivation, or rather in planting, of this (to us) indispensable crop.

After breaking up my river-bottom land in the spring, and laying it off as usual in rows of four feet, fearing another dry summer I ran another extra furrow in the bottom of the first with a cary, and followed with what we call a bull-tongue, *all as deep as we could*, then crossed back the same way; and with that small addition of two deep furrows I have no doubt but that I made at least 10 bushels more corn per acre, and with less rain than I ever saw a crop made with. In feeding this crop to stock we have not experimented very much, and use but little economy; yet I have no doubt but grinding or crushing, and cooking, would pay well. To the last inquiry under this head, (corn,) I do not believe that the trouble of gathering the manure from a hog-lot, or pen, would pay in any country, if fed only on shelled corn.

Wheat.—Guano is not used. The average product per acre is about 15 bushels; the time of seeding, October and November; of harvesting, June and July.

No particular system of putting in is followed here. The better the ground is prepared, the greater the yield; and the farmer gets well paid for all his trouble in ploughing and pulverizing for this crop. It is generally on the increase in this county; and ere long we shall produce enough for home consumption. At present we only lack mills of good quality. We can grow the grain at 50 cents per bushel, or less. Corn, cotton, or oats, grow well after wheat; but corn is generally preferred in this section. Manures are beginning to be used here in the growth of this grain, and all pay well.

Oats.—This is a valuable crop in this section of the country. I know of no crop that is more reliable than oats, and they pay more for labor done, or capital invested, than any crop here. There is but little choice in the different seeds used; all do well. Average yield per acre about 40 bushels; quantity of seed 2 bushels per acre. This crop does not exhaust the land, nor much renovate it if cut and carried off the land; but if pastured by hogs (which is a good plan) then the land is improved.

Barley.—This grain is not grown here; nor rye, in any great quantities. Rye does not exhaust the land even if cut, for a great quantity of straw is left with the stubble. It affords a good winter and spring pasture for young colts, mules, calves, and sheep.

Good crops of peas and beans are grown here in and among corn, as this is the only way we cultivate them. They are a valuable crop—peas especially.

One of my neighbors, Wm. S. Allen, has made an experiment this season on the pea crop. He planted 10 or 12 in or by every hill of corn on 60 or 70 acres of land, and can now gather more bushels of peas than corn. They have not injured his corn one bushel, nor hindered the cultivation of it in any way; will now renovate and improve his land, and fatten his hogs. What he gathers are worth 75 cents per bushel. Every farmer who raises corn ought to plant peas.

Beans are lately grown here for market. I planted this season 15 acres with corn; but the drought cut them short, and we shall make only about one-fourth of a crop. We plant a little bean, perfectly white and round, called here the soup or rice bean. They are a reliable crop; not hard as peas to harvest, for we pull off vine and all, haul in, thrash them, and feed the pods and vines to cattle. Price this year 75 cents

per bushel; last year $1. The bean I mentioned does not injure the crop; only a little in the way in stripping off fodder.

Clover and Grass are not grown to any considerable extent; yet we have as good grass lands as any found in this latitude. I sowed the different kinds of grass seeds you sent me last spring, just as the drought set in; all died but a little of the Lucerne, on account of which I am very sorry, but hope to succeed better the next time.

Neat Cattle.—We have no system of raising stock here, of any sort; and never count the cost, as the cattle live half the time on Uncle Sam's pasture.

The dairy is not attended to, except as a family convenience. Butter is worth 10 cents per pound to produce in winter. Cheese is only made for home use, and is of an inferior quality.

The best method to break a steer to the yoke, with which I am acquainted, is, to take him up at three years old; chain him to a tree or post, with a heavy chain; let him remain there until his head gets sore, for he will jerk a little at first; then put him in by the gentlest steer as a yoke-fellow; hitch them to a cart, and drive on. On the next day, put in his mate, if you think best, by another sober ox; keeping a gentle yoke always in for fear of fright or danger. After working for a few days, pair off, &c.

Horses and Mules.—The raising of mules, in this county, is very profitable. The expense, until three years old, does not exceed $35, at which time the animal is generally worth $75; and never less than $50. The best way to break a colt or mule is, to handle it while young; handle its feet and legs; rub and keep it all the time docile; when you want to use them in gear, put it on gently; treat them kindly and mild; the plough, or the dump cart, are both good places for breaking them; avoid all whipping, hallooing, and jerking, as all such treatment is unnecessary and cruel.

Sheep are only raised in this county for the little wool we use in clothing, &c.

Hogs are grown in abundance for market. Pork is now almost entirely the product of corn and oats. One barrel of corn will weigh about 250 pounds; and generally three barrels of corn, or ten bushels, will grow 200 pounds of pork, the mast helping out a little. The best breeds for this county are the common stock, with about one-fourth Berkshire. I do not know that I am acquainted with the best method of putting up pork, or curing the same; however, I will give you my plan as practised for 24 years. I endeavor to fatten by the first day of January, at the latest: and ten days sooner, if I can. After killing and cleaning, I cut up, or open, and sprinkle a few handfuls of salt on each piece, letting it remain spread out until all the animal heat and blood have passed off; then salt down with plenty of salt, more by sight than by weight. If the weather is freezing cold, it does well to salt warm; and then take it up and resalt in the night time, if the weather should turn warm. After the meat has thus been well salted, and penetrated by the salt in every part—after it begins to feel sleek or slippery, I hang and commence smoking with green wood, or bark; any sound green wood will do that is not resinous; ash is preferable; oak or hickory next; tanner's bark is good, and chips do well. Windy weather is good for meat drying. During 24 years I have not lost 50 pounds of meat by no salting and

curing well. We have killed even in March, and saved all. But attention is necessary in the management of curing. I have tried putting down bacon in corn, ashes, bran, &c., to keep out the skippers. I see canvass and sweet hay, applied around the hams, lately recommended as being excellent to keep and preserve them, and have no doubt that it is worth trying; fill all round the ham with sweet hay, and tie up tight; hang high and dry, and keep out the light.

Cotton.—Cotton is grown here, to some extent. The average yield per acre is about 200 pounds of clean cotton. Cotton does not pay under 5½, and is worth all of 6 cents to make it, in this latitude. Any crop grows well after cotton; for if the ground be entirely level, cotton does not soon exhaust the land; and, if rolling, it will soon wash off, or the soil will run to the bottom of the hills.

The rust may sometimes be stopped by ploughing or harrowing. It is generally occasioned by dry weather, and the plant getting in an unhealthy condition; after which the small insects attack it and give it that russet color. The boll-worm has not troubled this section very much. I do not think that cotton lands should be ploughed very deep, especially rolling lands; for, in my opinion, it would not increase the crop, and the soil would wash off sooner; subsoiling might do on prairie land or river bottom.

Cotton-seed as a fertilizer.—I have known it used, both in the growing of corn and Irish potatoes; nor is there anything better than this as a fertilizer, except the cotton itself. As before observed, if the land is not level, it will run off; and must be sown in wheat, oats, or planted in corn, or it will wear out; and must rest from cotton, at least. The South have always pursued a ruinous policy—so far as exhausting their lands is concerned—by running them consecutively in cotton, even for 10 or 15 years. They are beginning to see their error, and will, I hope, reform; but the damage is now irreparable, or nearly so. Lands that once produced a bale to the acre, will now scarcely produce 400 pounds of seed-cotton.

Sugar-cane.—This crop is not grown in this latitude.

Rice.—Only in small quantities.

Tobacco.—Only in small quantities, although this is a good tobacco-growing county, and every farmer might, with little cost, produce his own tobacco; and I have wondered why they do not do it—economy suggests the propriety of doing it.

Hemp is now on the decline; but little now cultivated.

Turnips grow well; but will only pay to cultivate in small fields, from a half to two acres.

Potatoes.—This crop grows well here, and in seasonable years all kinds do well; no new varieties.

Manures.—I have not had experience enough to suggest anything under this head, that would be of any advantage to the agricultural community.

Meteorology.—About the first of August, range of the thermometer in the shade about 99°. I have no means at hand for giving you the mean temperature of each month; nor the quantity of rain that fell in any, or all the months. I would simply say, that scarcely none has fallen here since the 4th of last May.

Yours, respectfully,

JAMES WILLIAMS.

CHUNNENUGGEE, ALABAMA,
December 18, 1851.

SIR: Your Circular of August last was forwarded to me by my friend, the Hon. Henry W. Hilliard. Before proceeding to answer the various inquiries relative to the agricultural productions and general husbandry of this region of country, it may not be amiss to allude to its topography and characteristics; confining my remarks to the county in which I live, knowing that you have other correspondents in different sections of the State, from whom you will learn the general results of the operations of the planters of Alabama.

The county of Macon embraces a variety of soil, though the most of its territory is a flat, level country; yet, through some strange freak of nature, a remarkable ridge was thrown up, running transversely oblique through the southeastern portion of the county, which seems to be the line of demarcation between the calcareous and sandy regions, dividing also the waters—those on the north running into the Tallapoosa river, and thence to Mobile bay; while those on the south form the head of Conecuh river, the principal tributary of Pensacola bay. Thus, after describing an immense circle, they mingle in the Gulf of Mexico.

The beautiful summit from which I write overlooks all the vast region extending to the high hills of Tallapoosa, a distance of 40 or 50 miles. Here, too, a few years ago, upon this identical spot, stood the grand council-house of the sovereigns of the land, who roamed at will over these wild romantic regions. They have passed away, leaving no vestige, no mementoes of their national existence, verifying the truth of Sacred Writ, which says, "The fashion of the world passeth away." Many interesting events connected with that strange race of people and the localities of Chunnenuggee, might be narrated; but I leave that to the future historian, whose duty it will be to commemorate the existence of a nation once formidable in warlike deeds, and will now respond to some of your inquiries.

This being a famous cotton-growing region, the cotton mania prevails to a great extent, absorbing all other considerations; hence, our system of agriculture is a most impolitic and absurd one. With a soil and climate most congenial to the growth of all the substantials, and even luxuries, of life, yet we are the most dependent people in the Union, relying mainly, as we do, upon our neighbors of the West for nearly all our supplies. By the adoption of a judicious system of agriculture, properly diversifying labor, the Southern people would soon be the most prosperous and wealthy people in the nation, for the bounties of nature were never more lavishly bestowed. Ours is a "blest heritage," indeed. The happiest results may be accomplished by reversing our present system. If, instead of planting two-thirds of our best land in cotton, as is now the universal custom, we were to appropriate two-thirds of it to growing grain, letting cotton be a secondary consideration, we would then have full barns, a plenty of fine fat stock, and be able "to live at home," perfectly independent. Under this system the cotton crop would be curtailed at least one-third, bringing it under 2,000,000 of bales, which would guaranty remunerating prices, and prevent those ruinous fluctuations in the value of our great staple.

Wheat.—There have been no experiments made with guano in growing wheat here. Until recently but little attention has been paid to the

wheat crop. The scarcity of mills and the rage for making cotton, tended to prevent it. But the result of the operations of the few who farm as well as plant, fully demonstrates the practicability of raising an abundant supply; yea, more than the domestic wants of the country require. By sowing the early kinds, the crop may be regarded as tolerably certain, and the yield from 15 to 25 bushels per acre. The kind of wheat exhibited at the great Macon fair, weighed 65 pounds to the bushel; and other specimens were but little inferior.

Corn.—I have no knowledge of any guano being used in raising corn. The principal manures used on our thin lands are cotton seeds, stable and barn-yard manures, all of which answer a fine purpose. On our lime lands corn grows most luxuriantly, and the sloughs yield from 40 to 60 bushels to the acre, with good cultivation.

Oats, Barley, Rye, Peas, and Beans.—The oat crop is becoming one of much importance, especially in the prairies or lime region. Here they grow luxuriantly, and yield most abundantly. They afford a most wholesome food for stock, particularly for work-horses and mules. When cut up or mixed with a little choppings or meal, they supersede, to a great extent, the use of corn. Barley is not cultivated to any extent; it makes valuable lots for brood-mares, &c. Rye is not raised for market here; it is regarded as valuable for green pasturage, and sustains our stock well during winter. Our lands usually yield from 15 to 20 bushels per acre; and it might be considered a valuable crop, for it uniformly sells for one dollar per bushel. Beans are only cultivated for culinary purposes, and grow finely in this climate.

The pea crop on our fresh plantations is one of great value, as our entire stock are frequently fattened by the run of our pea-fields. After gathering corn, many object to raising peas, alleging that their stock is destroyed by them. The results of my operations have been so different, that I am a great advocate for the pea crop, not only on account of stock, but as a fertilizer of the soil.

Clover and Grasses.—Very little attention has been paid to foreign or exotic grasses. I know of but one individual who has experimented with the red clover in this county; he seems to be pleased with his success, and thinks, upon our bottom or slough lands the red clover may be grown successfully. My own impression is, however, that the native or spontaneous grasses of the South are most reliable, and by proper attention might be made a source of national wealth.

Major S. Powell, of this vicinity, has recently made some valuable experiments, showing the vast product of our land, in spontaneous grasses; the most valuable of which is the crab-grass, which grows upon our corn land after the crop is laid by. He measured several acres in different portions of his field: from the first acre, on the high land, he saved 2,675 pounds of nicely cured crab-grass hay; from the second acre, which was in the bottom or slough, the yield was much greater, being 3,987 pounds. From his experiments, he feels well assured that from a ton to a ton and a half of hay could have been saved from each acre of his corn land. The crow's-foot and other wild grasses grow much more luxuriantly, and millions of pounds might be saved from our bottoms, which are annually wasted and lost through our negligence. Major Powell is of opinion that his hay is more nutritious and valuable than northern hay, and answers better for mules and horses than fodder.

Dairy Husbandry.—But little regard is paid to this branch. In a country where there are so few farmers, but little attention is paid to stock of any kind. None make butter or cheese for market.

Neat Cattle.—As but few persons pay attention to feeding these, it is difficult to say what the cost of raising would be. A good milch cow, of common stock, is worth from $15 to $20. Blooded stock, Durham or Devon, sell much higher.

Horses and Mules.—I find raising mules profitable, as there is but little expense attending it. They are usually put to work at two years old, and are less liable to disease than colts or horses. As I uniformly break a team every spring, raised on my plantation, I am inclined to think that the planters would find it to their interest to pay more attention to this branch of farm economy.

Sheep and Wool.—As our climate is mild, I know no reason why wool-growing should not be profitable. Our sheep require but little feeding, and little attention has been paid to this branch of husbandry.

Hogs are reared successfully, and as cheap as in any part of the United States. So much attention, however, is paid to cotton culture, that hog-raising is also neglected.

Cotton.—That region of country extending west of the base of the Chunnenuggee ridge, embracing the prairies or lime lands, yields upon an average 1,000 pounds of upland cotton per acre; while the eastern and sandy region yields from 600 to 800 pounds of seed cotton.

Sugar-cane grows well here, but is not cultivated with a view to make sugar.

Rice can be grown successfully, and many planters make enough for their own use.

Tobacco and Hemp are not cultivated.

Potatoes.—The Irish potato is grown only for culinary purposes. The sweet potato is a more valuable crop, but is not raised for market.

Fruit culture receives very little attention.

Yours, respectfully,

N. B. POWELL.

The COMMISSIONER OF PATENTS.

MISSISSIPPI.

EDWARDS, MISSISSIPPI, *September* 2, 1851.

SIR: The Circular from your Department, of August, reached me three days since. I make the attempt to answer your queries in part, even in the midst of pressing engagements. I do this that I may, as a citizen of Mississippi, render my mite towards making your Report more general; deeming it a duty to endeavor to obey all the calls of my country, as well as that those afflicted, like myself, with the "*cacoethes scribendi*," may still have a target to fire at; as it seems I furnish a better mark than any other of your numerous contributors. Why it is, the deponent saith not; though willing to "lay the flattering unction to my soul," that "birds will peck the best fruit."

I can say, with a "conscience void of offence," that I have labored, by close attention in watching results, to enable myself to give "truth, the whole truth, and nothing but the truth." If I arrive at conclusions differing from my friends, it is not that I design to propagate error, or that I do not desire, above all things, the happiness of my race, but that I have no better sense.

Many opinions advanced by me have been combated in private and in public; yet, at this time, I know of not one which has not received support from warmer hearts, and abler pens, and wiser heads, than I dare to assume to myself.

Among these has been oats culture, and the use thereof. The object of your labors in this department being to give information, I trust I may be allowed to give my views again. I do not think green oats, as a pasture, are at all advantageous to horses. I believe they will pay well when used as a pasture for hogs or cattle; for the young especially, and for brood ones whilst rearing pigs. I find that horses and mules suffer more in hot weather—pant and sweat more—when fed on oats cut up, heads and straw together, than when fed on corn and fodder; (we term blades of corn maize, fodder.) I plant oats yearly, and prefer an oat-field in June or July to any other feed for hogs; and when thus fed off to hogs, the land produces cotton the succeeding year better than after any other crop that we use as a crop. This is the amount of my oats heterodoxy, I believe.

I am also heterodox on *feeding peas to hogs*, and I can only refer to my published opinions; adding, I am as firmly convinced that the pea I use will destroy a stock of hogs, by turning them to the quantity I usually have, even with salt, ashes, &c., as I am convinced of any other fact in agriculture. I do not assert that it is green or dry peas, frost bitten or not; but I suggest, if it be not the decay in the pea producing a poison, as does unsound corn, ergot, and unsound potatoes, &c. I have sown this year over 50 bushels of peas, and can show 100 acres that are now almost one mass of pea-vines; yet I never let anything but my meat hogs therein, save an occasional run of my horse stock.

My next heterodoxy is upon the *culture of corn*. I hold, the planters of the South do not leave corn enough on the ground. Of course I do not mean that corn is never too thick. Upon land properly drained, I prefer level culture; but if low ground, the land should be ridged; then, I doubt if so thick a stand should be left. I dare to demand of any one visiter to this place, if he has not seen, for the past 12 years, at least a fair crop for the land, and that there is seldom ridge enough to show where corn was grown; and even this dry year I will average my crop at 40 bushels, taking out a few acres of a poor washed ridge, and some fresh land where I failed in getting a full stand. I have 110 acres as a crop, and I expect 4,000 bushels; 10 acres, not included, being used as hog feed.

I now proceed somewhat in order to answer your queries.

Corn.—No guano used that I know of: I cannot tell the average product, as the year has been generally very unfavorable. I did not have rain enough to wet the earth 2 inches from 7th April to July 4th.

The mode of culture I prefer, and therefore deem "best," is to break up land deep—6 inches—and thorough, in large beds, say of 32 feet; run off rows with a shovel plough, 4 feet distant; this is invariable with

me, giving fewer or more stalks in the row, according to poverty or richness of land. Drill corn at rate of about half a bushel per acre; cover with an iron-tooth harrow. When corn is fully up, run round with a narrow shovel-plough, (the bull-tongue, also called scooter plough,) clean with the hoe very nicely, leaving no grass or weeds; thin out either at this working, or wait for a wet spell of weather. In a few days, run round again with a 6-inch shovel-plough. I prefer these ploughings to be deep and near to corn. The latter ploughing should mould the plant well. If, by this time, grass has begun to appear in the middles, I would use an iron-tooth harrow to tear up clods and destroy all grass, if it required running the harrow twice. In the course of some two weeks after last ploughing, if time permitted, I would hoe the corn, levelling the ridge, cutting up grass, and cleaning around stumps and trees; and two weeks, or near it, after second ploughing, I would run another furrow with the largest shovel, or use the sweep, which breaks out the row, if not broken out. I would do so early enough to keep the rows clean. When my corn is in bunch, I sow peas, and either use the harrow, or sweep, or shovel-plough, to cover, which cleans the row and lies by the corn; though, if not hoed previously, I now give a hoeing, so as to leave the corn-field clean for peas and corn.

Peas.—We do not plant the pea known in England and the Eastern States: the pea is different; the vine is different, growth and all; it more resembles the pole-bean in growth, but abundantly more vine, growing and fruiting best in the fall. I have seen writers, of the South, too, giving an analysis of the pea, when that analysis is of the English pea, so known by South country folks. (I allude to this that there might be a better understanding.) I prefer grinding corn for horses, mules, and oxen; and I think that when corn bids fair to sell at 75 cents a planter can afford to pay toll.

To feed hogs, I prefer making corn into meal, and then into mush, yet giving them at the same time dry corn in a separate trough. Having tested these matters, for my own satisfaction, long since, I cannot conveniently refer to my figures.

My hog-pen manure, as all other kinds, is applied to cotton, and without note as to increase, my object in manuring being not alone the present increase. I therefore use manure more freely than would give correct data.

I use the cow-pea of the long variety upon all corn land, principally as a renovator; using 10 to 15 quarts per acre; being scattered as regularly as possible over the entire surface, before the last ploughing. This has been a practice of some 15 to 18 years' standing; and so thoroughly am I convinced of the value of this pea as a renovator, that I intend to average hereafter one bushel per acre, even if I have to plant and cultivate peas merely for seed. I am not satisfied that I sow now enough.

I find that where the shade is most dense, and earliest, the land has improved most. I have corn now on land cleared and cultivated in corn in 1830, which will *this year* give me 40 bushels per acre, to which there never has been applied any manure; no other aid used, save a rotation of two years in cotton, and one in corn and peas. The land being good, I did not deem it needful to make any greater change this year in corn; and to give a better growth of vine, &c., to turn under, I shall next

year continue in corn, and thus bring it under my usual rotation—two years in corn and peas, and one in cotton, for all ordinary land.

I hope this corn and pea story will not be tedious. I thus dwell on it because I am thought as discarding the pea; whereas, I know of not a solitary planter anywhere who bestows more labor to secure a growth of the pea-vine. I have 20 acres planted in peas, 8 feet apart, which have been ploughed three times and hoed twice; but I do it as a renovating crop. Fifty head of hogs will feed my family abundantly; I have almost two acres per head.

Horses and Mules.—I regard the growing of these animals to be more profitable than making cotton to buy them with. I have now several head, and after paying for the insurance—no other way will I breed—I do not know the expense. My colts are reared in woods, pasture and field, scarcely ever fed, and at an expense so small that I am not able to say.

I prefer to work brood mares moderately; do not want them fat, unless upon pasture feed; prefer to keep them in good condition upon as little corn as possible. To colts I never feed corn until they work. Break geldings at five months; mares at four. They do not grow to size of the Kentucky stock, but will do as much work, live longer, and cheaper. I have a mare by *Monsieur Tonson*, out of a Richenel's mare, that is now a good work animal; foaled in 1835, and worked yearly since broken.

I halter up mules with a three-quarter rope, Kentucky make, having the rope 30 to 50 feet long; lead the mule about, never suffering it to break loose. After working with it half an hour to an hour, before getting tired or sullen, let it loose, with halter on it, in the lot. It is occasionally led about until it will lead, and has learned not to resist, for several days, when it is put in the wagon, or gin, and worked moderately. I prefer to buy mules in October, even at $10 more, so as to break slowly in the winter.

Hogs.—The best hogs I have ever tried are the Berkshires—the ridicule of all men to the contrary notwithstanding. I believe oats, Bermuda, open pasture, abundance of water, never letting hogs out of pasture, will be found cheaper in the country at large than any other plan The boar should not run with the stock; the sows should not be kept fat; and young hogs for the knife should never be stinted, or permitted to get poor. If corn and hogs are stinted when young, they never make a full crop by any after-labor. These are my honest sentiments, though others equally honest may, and have a right to, dissent.

Cotton.—I have written more than I ought; I have no right to so much space, nor to the attention of your readers. I will close with this subject.

My average crop last year was 1,100 and some pounds; this year I think it possible that I will do better, although the year is so generally against hill-land. It is too difficult to arrive at a just conclusion as to cost of production. I have never seen a calculation that pleased me, and I cannot offer one. I have used no preventives against the enemies of the cotton crop, save the hoe and the plough. I believe my usual depth of ploughing to be 6 inches. I ridge up all land with two-horse ploughs, endeavoring to do effectual work; my rows are 4 to 5 feet distant. This year I ran, after the laying off furrow, 7 furrows to break out entire, in a $4\frac{1}{2}$-foot row; thus cutting less than 8 inches to each furrow-slice. I

prefer to give one or two extra furrows in the spring, and have all land broken up 6 inches, rather than hurry over and slight my work. I have subsoiled to a small extent, but I regard it as labor unwisely spent, unless the land has been drained; with our heavy, washing rains, the clay is washed down to bottom of furrow, and thus, when dried off, the bottom is harder than before ploughing.

Allow me to say something of the last year's crop. I believe that the commission merchants have done the planting interest harm, or I am mistaken in facts. I think, so far as my acquaintance extends, that one-half of the bales sent off were lighter by 20 pounds than usual, owing to the difficulty of pressing—the air being so dry; and I believe there were more motes and worthless stuff called cotton sent forward than ever before. I know that there was nearly one-tenth sent from this place of such cotton as I never gathered before, and I have heard of others doing the same thing. Bolls were opened, and the pods taken out, which had been injured by the frost so much that I only expected it to be bought for making paper.

Now let us estimate: Admit one million of bales went forward lighter by say 15 pounds—thus there would be 37,000 bales less actually; admit only a twenty-fifth went forward of the motes and frost-bitten bolls, we would have 100,000 other bales: take this from the actual receipts, and it will nearly make up for the deficit in American consumption, or it will give less available cotton in Europe than is shown by those interested in the cry of a large crop.

The present crop will not be materially less than the crop of 1850, although the hill-crop per acre is decidedly less; yet the planters acting so suicidal as they do, having planted more extensively, and the swamp lands doing so much better than usual, with increased culture, we need not count upon less than the crop of 1850.

My own crop, though as good as that of 1850, probably, yet is under my average of 12 years. I therefore place my figures at 2,300,000 bales.

I hope, honored sir, that these hasty remarks *may* aid somewhat in the objects contemplated by your labors for the benefit of agriculture.

With respect,

M. W. PHILIPS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

Query.—Are not stalks of cotton and corn really *stalks*, and not STOCKS, as many write them?

TEXAS.

BROWNSVILLE, CAMERON COUNTY, TEXAS,
January 29, 1852.

SIR: Your Agricultural Circular has been handed me by our postmaster, and I hasten to respond to such of the queries as can be answered from this section of country. We are in, or about, 26° north latitude.

Corn is the only agricultural product raised at this time in the valley of the Rio Grande. Average product per acre 60 bushels (when we ge a crop at all). Cost of production, not exceeding 12½ cents.

The system of culture here is entirely different from any part of the United States. The plough used is made of the crotch of a mezquit, or other hard wood, with an iron point slipped on and held in its place by claws. The ground is generally ploughed with these ploughs three times, and planted in rows 3½ feet apart. When the corn is 4 to 6 inches high it is ploughed again, and the ground thrown to the plants; when knee-high it is hoed, and again hoed just before tasseling. It is all consumed in preparing food for our own people; and we annually import from New Orleans an immense quantity.

Neat Cattle are raised here in immense quantities. The breed is the native cattle of this country and Mexico. They are herded upon our prairies and mezquit ranges—one "vaquero" being sufficient to attend to 200 or 300 head. He earns $6 per month, and his ration of corn costs about $1 more. On this he is bound to support himself and family; and it is generally the case that a man once engaged as a servant remains so all his life.

The cattle breed at between two and three years of age; and, as we have no hay to cut, no soiling, or stall feeding, the cost of rearing until three years old is merely nominal.

Our Mexican neighbors will sell heifers, rising three years old, at $3 per head. Our steers are broke to the yoke at three or four years old. They are yoked by the horns, (quite a primitive way,) and are rendered tractable by the unceasing use of the goad, (a long stick with an iron spike in the end.) Our beef is allowed by judges to be of the finest flavor—equal to any to be found in the Union.

Horses and Mules.—Our stock-raisers divide their mares into parties of 25 or 30 each, with a stallion, or *proof jack*, as it may be desired to raise horses or mules. They are herded in the same manner as our neat-cattle, and the cost of raising does not materially vary. Mares for breeding purposes are now worth $6. They could be obtained two years since at $3 and $4, but the demand for the interior has reduced the supply here and raised the price. Unbroken colts, (average,) at three years old, can be bought for $8 to $10. Mules, at $30 to $40 per pair, according to their appearance; and full grown mules, at from $20 to $40 for superior ones.

The manner of breaking a young colt for service here is, to throw him by the lasso; and, while down, gird on the heavy "vaquero" saddle; blind his eyes with a band made for the purpose, and let him rise. His being blindfolded prevents any movements on his part, until the rider is seated in the saddle, with his heavy whip and tremendous spurs. The bandage is then removed from his eyes, when he commences plunging and rearing, to detach the unaccustomed burden from his back; the rider plying whip and spurs as fast as his strength will permit. A gentle horse is then ridden in front of him, and he is induced to follow, first slowly, then faster, until finally it becomes a run. He is thus run until pretty well tired, when his head is turned and he is ridden back gently to the place of starting, and is considered broke.

Sheep.—Sheep are raised pretty extensively here. They are considered the most profitable stock that can be kept, as they yield a quicker

return than cattle or horses. The breed, until lately, was the native breed of this country, which, by in-and-in breeding, had deteriorated to its lowest ebb. Some two years since, however, some of our most enterprising citizens procured several fine merino, Bakewell and Saxon rams, and have now a fine prospect in the number of half-breeds, and the enhanced value of the wool.

Judge J. B. Bigelow, of this place, was the first to attempt the improvement of our sheep, and he succeeded so well that several of his friends have now gone into the business, and our section of the country bids fair to produce wool of an excellent quality, and in sufficient quantities to become an object. Major W. W. Chapman, United States army, of this place, has done much to encourage the improvement in sheep, and to develop the agricultural interests of our valley in general, and is entitled to the gratitude of those who are so materially benefited by his counsels.

Our sheep have lambs twice a year. They are herded through the day and folded at night. One man and his dogs are sufficient to take care of 2,000 head, except when the ewes are dropping their young, when additional help will be required for about a month each time. Counting all drawbacks upon sheep and lambs, they increase here 50 per cent. per annum. The common sheep shear about one pound, and are shorn twice a year. The expense is, one shepherd, at $5 per month; ration, $1 = 6×12 = - - - - - $72 00

One man two months in lambing time, $6 × 2 = -	12 00
Shearing, one cent per head, (2,000 sheep,) twice per an'm	40 00
Building fold - - - - - -	10 00
Original cost of 2,000 sheep - - - -	1,000 00
Interest, at 8 per cent. - - - - -	80 00
Capital employed, and expenses on 2,000 sheep -	1,214 00
Cr. by 4,000 pounds wool, at 12½ cents - - -	$500 00
" 1,000 lambs, at 25 cents - - - -	250 00
Product of 2,000 sheep in one year - - -	750 00
Cost of maintaining same - - - - -	214 00
	536 00

or over 50 per cent. on the investment. Fat sheep are worth from $1 to $1 50 for killing. The half-breeds of Judge Bigelow, before referred to, will average $1 50. Our native breed has a fixed value of 50 cents.

Cotton was formerly cultivated in this valley; but the advent of the American army here in 1846 was the cause of all agricultural operations being suspended, when the farmer took to his sword instead of his ploughshare. Cotton has not been cultivated here since, although several of our land-owners are about doing so this year.

Sugar-cane does well. It is, as yet, only cultivated to sell in the stalk for eating, as our Mexican friends are very fond of it in that state.

Tobacco has not been cultivated here as yet, although I have not the least doubt that when our lands get into more general cultivation, tobacco will be a staple product.

Manures.—None used. The only lands being in cultivation are the river-bottoms, which overflow, on an average, once in three years, leaving a rich deposite; and thus we go on—the Mexican farmers not knowing anything about guano, poudrette, or gypsum, as fertilizers of the soil.

1851.	Daily mean of thermometer, detached.				Monthly mean.	Rain.	General remarks.
	Sunrise.	Nine a. m.	Three p. m.	Nine p. m.			
January....	53.45	63.67	66.61	58.45	60.03	.95	Rained 10th, 11th, and 31st.
February ..	60.71	67.53	69.96	62.64	65.10	1.04	Rained 2d, 15th, 18th, 19th, 20th, and 25th.
March	59.16	67.67	73.93	66	66.69	.40	Rained 23d and 28th.
April.....	69.53	78.66	82.13	70.04	75.43	1.15	Rained 3d, 13th, and 30th.
May.....	75	84.54	86.66	77.99	81.20	.90	Rained 25th.
June.....	71.53	87.53	90.53	77.53	83.66	2.35	Rained 16th; therm. 102° at 12 m, 25th.
July.....	75.83	87.58	88.64	77.67	81.95	3.65	Rained 2d, 3d, 4th, 6th, 7th, and 8th.
August.....	77.48	94.96	91.36	77.54	84.48	1.65	Rained 9th, 10th, 14th, and 20th.
September.	69.04	84.43	82.16	75.33	75.78	5.60	Rained 1st, 2d, 14th, 16th, 17th, and 19th.
October ...	63.38	84	76.67	68.87	66.32	4.10	Rained 3d and 23d; therm. at 100° at 9½ a. m., 10th.
November.	54.33	67	67.04	58.83	61.02	1.00	Rained 5th and 22d; frost 25th.
December .	54.38	61.70	64.19	64.19	57.51	4.70	Rained 6th, 7th, 11th, 13th, 22d, and 23d; frost 18th.
Y'rly mean	65.32	77.44	78.32	68	71.60	27.49	

The above is taken, by permission of Dr. N. S. Jarvis, U. S. A., from the meteorological register kept under his direction at this place, and can be relied upon as correct.

We had 42 days on which rain fell, which, in the aggregate, amoun s to but 27½ inches, not being in quantity sufficient to mature corn planted after 1st of February. Our second crop is planted from the 1st to 15th of August, and bids fair to give us a large return for our labor; but the frost of 25th of November did the work for us, not leaving us even the stalks for fodder. Our lands are now in a good state, as they were pretty generally overflowed, and retain the moisture a long time. Many of our farmers have already planted their corn; others are yet at work planting.

These hasty remarks are submitted for what they may be worth, as I doubt not some other person, better qualified, has responded to your Circular from this valley; but if attention should be called to our valley through the means of this, I shall consider myself more than paid for this mite to your valuable Report.

It would be well to state that good land can be obtained in our county, with quiet titles, at from 10 cents to $10 per acre, according to its situation and improvements. All of which is submited by

EDWARD DOUGHERTY,

Secretary Cameron County Agricultural Society.

To the COMMISSIONER OF PATENTS.

San Augustine County, Texas,
December 1, 1851.

Sir: Your Circular of August came duly to hand, and has been noticed. I herewith submit a few thoughts which are mainly from my own experience, having followed the plough thirty years; was brought up on a farm. Athough my success has been equal to any of my neighbors', it is not from book-theory, but from practical experience. I will endeavor to answer correctly the questions propounded; and if they are worthy of embodying in your Report, I shall feel amply rewarded.

Cotton and its Culture in this County.—The Hogan cotton I prefer to any I have tried. It yields the most per acre, to wit: One acre in Hogan yields 1,788 pounds of seed-cotton; Petit Gulf, 1,300 pounds, planted in the same kind of soil, at the same time, and cultivated in the same way. One hundred pounds of Hogan cotton in seed, yields 69 pounds of seed; motes, 1 pound; clean lint, 30 pounds—equalling 100 pounds. One hundred pounds of Petit Gulf cotton in seed, yields 69½ pounds of seed; motes, ½ pound; clean lint, 30 pounds—100 pounds. No difference, as I could perceive, in the quality, or in the labor to gather it. In fair soil a hand can cultivate ten acres in cotton and three in corn, which will support the team and board the hands, with some to spare for stock. The best plan that I have tried to avoid the plagues that so often interrupt cotton, especially when young, is to plough the soil deep with a double team. Where cotton has been before, reverse the rows, or cross. Delay planting, even here, until the 20th of April, when the soil is warm; it is much the safest plan. I have found it grows kindly, and bears equally well, and is much the easiest to cultivate. As to the boll-worms, caterpillars, &c., I think they are produced mainly by the wet weather peculiar to the season during June and July; so I have no remedy against them.

How to treat Plough-teams to keep them healthy.—Feed them with what they will eat clean; increase or diminish, as may require, for all teams differ in the quantity of food they consume. Clean out everything from the trough; salt regularly every Wednesday night and Saturday night, when it can be had; pasture them occasionally while ploughing them. A team should never be interrupted before day, as it tends greatly to injure them.

Treatment of Hands.—Feed and clothe well; speak kind to them; never use any bad language to them; have them retire at regular hours—say 9 or 10 o'clock. Never interrupt them till daylight; then to business promptly. More injury is done to hands by their keeping bad hours than by the labor they perform. The main point to guard is, take care of little things that cannot help themselves. The great road to success is close attention to business—changing or governing our acts as circumstances may require.

Weight of corn raised this year, 1851, (per bushel,) 51 pounds, raised in upland.

Weight of corn raised in 1850, (per bushel,) 52 pounds, raised in upland.

Weight of corn raised this year, 1851, (per bushel,) 65 pounds; Spanish corn—in bottom land.

Red peas, per bushel, 62 pounds.

White peas, per bushel, 66 pounds.

Wheat, per bushel, 58 pounds; some years it weighs 60 or 62 pounds.
Rye, per bushel, 56 pounds.

I have no thermometer, nor water-gauge. I give you the number of days it has rained for the last five years, from my journal:

Months.	1846.	1847.	1848.	1849.	1850.	Total.
January	7	8	5	18	15	53
February	10	11	12	7	9	49
March	9	12	14	12	11	58
April	13	12	12	11	11	59
May	9	7	10	19	10	55
June	9	16	15	16	19	75
July	13	17	13	23	16	81
August	19	10	11	19	10	69
September	7	7	5	12	1	32
October	4	2	3	6	5	20
November	7	10	13	13	6	49
December	8	11	10	14	15	58
	115	123	123	170	128	659

Cotton-seed is a good manure, generally. What it will increase in corn, or any other grain, per hundred pounds, I cannot tell. One thing I learned this year: I placed a large handful, with rotten cotton-seed under, in a portion of my corn-hills. The season being so dry, it injured it very materially. It did not produce as much as when there was none on the same kind of soil; and the exact difference I did not ascertain, but think it about one-fourth less where the seed were, than where there were no seed.

The best kind of Sweet Potatoes.—Red Bermudas grow well, and are easiest kept. Round yams next. What the cost of raising, or amount raised per acre, I know not. It differs very materially in different soils, or even in the same soil.

There are many things required to make a good farmer. Some men, who are professed hands with pen and ink, cannot plough a straight furrow, nor gear a horse, nor do they know when it is correctly done for him to work easy. If I know anything about it, it has been by knocking the clods, under which I must soon be laid; which is the end of all flesh.

I am, respectfully, your friend and obedient servant,

HENRY BROOKS.

To the Commissioner of Patents.

WHARTON, WHARTON COUNTY, TEXAS,
December 5, 1851.

SIR: Your Circular, calling for information, (agricultural,) was handed to me by the postmaster at Wharton who requested me to answer it.

Having been engaged in the county for 13 years in the cultivation of corn, cotton and cane, the statements I shall make will be the results of my own experience, corroborated by the opinions of many, with whom I have consulted. But little information, however, of general interest, can be expected from a new country; and, particularly from one for which nature has done so much, and art so little. That little, I will now give you; premising, however, that the soil of the country is entirely alluvial, of immense fertility, and of unknown depth; that, though there is much prairie land in the county which has been improved by the yearly burning of the grass, yet cultivation, with few exceptions, is confined to the canebrake and timbered lands. These remarks will make it unnecessary for me to notice your queries as to manures.

Corn.—This grain is raised in great abundance; but only for home consumption. Fifty bushels are considered as the average yield per acre. I think this too low, for my crops have ranged from 40 to 90 bushels; and, in two years only, out of 13, has the yield been less than 50 bushels per acre. If cultivated for sale, the cost of production would be about 25 cents per bushel. My mode of cultivating corn is peculiar; and, as I believe it to be the best, I will state it. As my soil is light, and does not break up in clods, I do not break it up before planting. The furrows are opened four feet apart, and about four inches deep. I then drop about two and a half or three feet apart in the furrows. A furrow from each side is then thrown over the corn; and, after all is planted, the middles are broken out, leaving the ground ridged up over the corn, to the depth of six or eight inches. When the corn is about to come up, a one-horse iron-toothed harrow is run over the ridges lengthwise. This throws off much of the dirt, and leaves the ground clean for the corn. When about a hand-high, a turning-plough is run around the corn, with the bar next to it. The furrow is shallow; but, as I use a wide plough, the dirt meets in the middle, and the ground is left clean, except in the drill; the hoe-hands follow the plough, clean the drill, and thin out the corn to two stalks for every two and a half feet. As soon as the weeds make their appearance, one furrow is thrown to the corn from each side; ridging it up only enough to cover up the small weeds and grass. The corn is now knee-high, or higher. Before the weeds in the middle get too large to turn in, I run another furrow around it, at a greater distance from it, but still near enough to lap a little more dirt around it. I then break out the middles, with one or two furrows, and my ploughing is done. The corn, at this time, hides the ploughman, and shades the ground well. If the season should be favorable for weeds, I find it necessary to clean out the middles with sweeps, not running more than an inch deep; or, to pass over it with the hoes, to take out the larger weeds. It will be seen that, with the exception of the two furrows throwing the dirt from the corn, I give but one ploughing, but that in broken doses. The object is to avoid cutting the roots. As the corn gets larger, and the roots spread wider, my furrows are run further from it. I follow the same plan in cultivating the sugar-cane, and for the same reason. I

am fully satisfied that this plan will yield more corn per acre than any other that I know of.

Oats and rye do well; but little of either is sown. Yield per acre, not known.

Neat Cattle are raised in great numbers on the prairies. Cost of raising a three-year old, not known; but next to nothing. Stock cattle generally sell for $4 per head, all ages counted. They are neither fed nor salted; and the only attention they need is branding, and occasionally collecting up those that stray off. No improvement in breed.

Horses and Mules, from Mexican mares, are raised by a few; but, though the rearing of them is very profitable, yet enough are not raised in the county to supply its demands. The mares may be bought for from $5 to $10; they are never fed. The cost, therefore, of raising a three-year old mule or horse, would be but little more than the interest on the price of the mare; from $20 to $40 would be the value of the horse or mule at three years old.

Sheep.—There are but few in the county. They do well; but little attention is paid to them.

Hogs are raised abundantly; but little attention is paid to improving the breed.

Cotton.—This is the staple crop of the county. One bale, weighing 500 pounds, is the average per acre. More is raised, but that is the average saved.

The question with the planters here is, not how much per acre, but how much per hand. Ten bales, of 500 pounds each, are occasionally saved to the hand, and it is the general opinion that eight bales per hand is the average crop. I do not think the average is more than seven bales.

Great diversity of opinion exists as to the cost of production per pound—some say four, others six cents per pound. Their opinions may be reconciled by supposing that they base their calculations on different qualities of cotton. If a planter should tell his hands to rush ahead and take no pains in picking, he will get much more cotton saved, but will have an article that will rank as inferior, or ordinary. This will not cost him more than four cents. Should he require them to be more particular, he will save less, but the quality will be better—say middling, or good middling, which will cost him about five cents. Should he be very particular, he will save still less, but will have fair, or fully fair cotton, which will cost him six cents, or more. The quality raised here ranks, generally, as middling, and I think costs about five cents. The cost is difficult to estimate. A good manager can make it cheaper than an indifferent one, and a small planter cheaper than a large one; and there are other contingencies. Neither the rust nor the boll-worm has injured us enough to be noticed. The army-worm is our only dread, and against it we have no preventive. The best plan is to plant as early as possible, so that many bolls may be matured before they come. We have a periodical rain that sets in about the 15th or 20th of June, and generally lasts two weeks—raining nearly every day. The worms never come till after those rains; and never, unless the rains continue much longer than usual. Half a crop, or more, of bolls will be matured by that time, if planted early.

Sugar-cane.—There are but four plantations of cane in this county. One of them was commenced by Mr. Mercer, near Egypt, before the Texas revolution, and has been profitable. The others are about three years old. I have neither known nor heard of premature decay of the cane. The canes are planted in rows, eight feet apart, and a good stand of rattoons will come up yearly, for five or six years. Our experience will not justify us, as yet, in making any suggestions as to the culture of cane or manufacture of sugar. Cost of production about three cents per pound. I think experience teaches that the cultivation of cane, as a sole staple crop, cannot be relied on, with certainty, in this county. We never fail to have frost by the 12th of November. It has once occurred as early as 25th October. This frost always kills the cotton, and too frequently the cane; and it generally becomes warm soon after. The cane will be spoiled, unless speedily worked up.

I think the most profitable plan would be to plant half a crop each, of cotton and cane; the cotton to be planted early, and of an early variety. It could be all saved carefully, and would therefore be a fine quality, before the cane crop would need working up; for, as there would be but half a crop of cane to take off, this operation could be delayed with great gain, both in quantity and quality of sugar, for the cane sweetens rapidly in the latter part of the season.

The cultivation of the crop would be light; and I think the yield of five bales of fine cotton, and 5,000 pounds of sugar, might be calculated on, with almost certainty, to the hand. Average yield of sugar, about fifteen hundred pounds per acre.

Rice.—We have no lands suitable for the swamp rice. A small patch was sown last season of upland rice; it was very flourishing, and the grain filled well, but it was destroyed by the birds.

Tobacco grows luxuriantly, but is not cultivated for sale.

Potatoes, both Irish and sweet, are raised in the greatest abundance. It is said that the yield per acre is from two to five hundred bushels. As they are never measured, this is but *guessing*. Cost of production about one cent per bushel.

Fruit.—With but few important exceptions, the peach is the only fruit cultivated. They are grown abundantly, and are of superior flavor. The best preventive of disease in the trees, is to plant them in a situation exposed to the north, and to cultivate the orchard.

Meteorology.—As no observations have been regularly recorded in the county, the questions under this head can only be answered generally.

From the 15th of July to the last of August is our warmest season, during which Fahrenheit's thermometer ranges at 3 p. m. from 88 to 94°; I have occasionally seen it as high as 96. Frost occurs about the 12th of November, after which there is much pleasant and even warm weather; and in some seasons there has been no more frost during the winter. Most commonly we have a succession of changes, from cold to pleasant, and back to cold, the time taken up in making the revolution being from one to three weeks. There are seldom more than two or three days of cold weather together, during which the thermometer, early in the morning, will frequently fall below 32°; I once saw it at 20°. Spring opens about 1st of March, or earlier. Latest frost known was on the 7th April. Our only cold wind is from northwest. Our winds are variable

in winter and spring. From 9th of May to last of August we have a regular wind from southeast—a deflection of the trade winds.

We have frequent rains in winter and early spring: a periodical rain of about two weeks at the summer solstice. Fall is generally dry, though we have much windy weather; yet I have known but one dangerous wind.

Very respectfully, yours,

M. L. WEEMS, *M. D.*

Hon. THOMAS EWBANK,
Commissioner of Patents.

SEGUIN, GAUDALUPE COUNTY, TEXAS,
November 15, 1851.

SIR: Your Circular, dated August, is before me; and I will, in as brief a manner as possible, give you such information as I can from my own knowledge communicate.

Wheat.—On wheat we use no manure of any kind. Average crop, 20 bushels per acre. Time of seeding, 1st of January. Time of harvesting, 1st of June. We use one bushel of seed per acre; plough once from 4 to 6 inches deep. The yield is increasing. We are not troubled with flies or weevil. Price, $1 50 to $2 per bushel.

Corn.—No manure used. Average crop from 40 to 50 bushels per acre. Cost of producing per bushel, 12 to 15 cents. The best mode of producing is to plough deep in winter, and plant about the middle of February. We hoe our corn once, and plough twice. By the time this is done, corn is too large to work. Experience has taught us that to plant late, or cultivate too long, will not produce a good crop.

Oats yield from 35 to 50 bushels per acre. *Rye* about the same. *Peas and beans*—but few raised; few plant only for table use.

Clover and Grasses.—We have none except the grasses which grow spontaneously upon the wood-lands and prairies. We often cut here from mezquit prairies, but I do not know the precise yield per acre. It is immense.

Dairy Husbandry.—There is no regular system among us; consequently I cannot tell the yield of cheese or butter per cow. We churn in the good old way. Put butter down by washing well, then salting sufficiently in casks, without exposure to the air after salting down. Average price of butter 20 cents per pound; cheese, from 8 to 15 cents per pound.

Neat Cattle.—The cost of rearing till three years old, $1 per head. This is for the attention to them, as we do not feed at any season, and but few salt. Price at three years old, $10. The value of good dairy cows in the spring is from $10 to $12; in the fall, from $12 to $20. We have but little trouble in breaking our steers to work. Our usual mode is to neck them together a few days, then put on the yoke, and put them in the swing of the team. In 19 cases out of 20 they work at once.

Horses and Mules.—They are very profitable. The expense of rearing until three yeras old, exclusive of cost of season to horse or jack, about the same as that of a steer—say $1. Brood mares do best to be turned upon the prairies, driven up and salted once a week. We take up our young horses or mules and teach them to lead by the rope or halter, then saddle

and ride them. This I consider the best mode of breaking. Many, however, catch them up from the prairie and ride at once, which generally results in the abuse of the animal.

Sheep and Wool.—They are profitable. The cost of growing does not exceed 2½ cents per pound. We only use hay during the cold weather in winter, which usually lasts from two to seven days; then turn them out upon pastures or prairies. Large sheep are more profitable for wool or mutton. It costs nothing more to raise fine than coarse wool. Average number of lambs, one to each ewe. My own sheep, however, have averaged something over this since I have adopted a method of taking the bucks from the ewes, so as to let them have lambs but once a year, and all at the same time. I prefer my lambs to come from the 1st of January to the 1st of March. The lambs grow with astonishing rapidity, the ewes having young at 12 months of age.

Hogs—Irish Grazier.—The method adopted in procuring bacon is to take care of the pigs until they are three or four months old, then let them shift for themselves until two years old, when, generally, they will fatten on mast of pecans or acorns. The usual mode of putting up bacon is to take the bone out, and salt down in bulk from 15 to 30 days; then wash, hang up, and smoke well. Those who take great pains save the ham without taking out the bone.

Cotton.—The average yield is one bale (400 pounds ginned cotton) per acre, and cost of production more than cotton is now worth. We have no rust, and have never had the army or boll-worm in this county. Our land is so rich that it will not require rest for many years. We use no manure or fertilizer of any kind.

Sugar-cane is only planted in this county by way of variety, or for experiment. So far it has done well when planted on low bottom-lands.

Rice.—I am of opinion that rice will not do on upland. At present I know of none being raised in the county.

Tobacco is only grown by a few individuals for their own use. It grows luxuriantly, and is said to yield well.

Hemp.—We have none.

Root Crops.—We only raise beets, carrots, and turnips, for table use. Potatoes (Irish) yield from 100 to 300 bushels per acre; the cost of raising, very trifling. We plant by breaking up land deep; then open a deep furrow; put down the potatoes about 8 inches distance; throw over them a small quantity of hay, or trash of any kind; cover by throwing two heavy furrows on the potatoes. If they come up too early, we keep them from frost by covering them lightly with loose dirt drawn up with the hoe.

Sweet Potatoes.—We bed out seed in February or March. As soon as the slips are sufficiently large, make up hills or ridges and transplant. Average yield, from 250 to 500 bushels per acre. We do not cultivate either only to keep down grass and weeds.

Fruit.—I greatly fear this is not a good fruit country. I have been about 13 years in the county, and find there are many difficulties in the way of an orchard of any kind.

Grapes do well here; but it is with much difficulty the large red ant can be kept from destroying them.

Manures.—We save none.

Respectfully, T. H. DUGGAN

Hon. THOMAS EWBANK.

COLUMBUS, COLORADO COUNTY, TEXAS,
October 24, 1851.

SIR: The postmaster of this place having received your Circular, asking for information on the different subjects of agriculture, and thinking that I, being "assistant marshal" for this county, would be better able to give the information sought than he himself would be, handed the Circular over to me, and requested me to answer the different questions therein contained. Some of the information I can give correctly; some will be guess-work; however, I will keep strictly within bounds.

Wheat.—None raised; and I would say, to begin with, guano is not known here, nor any other manure used.

Corn.—I have known 75 bushels raised to the acre; but 50 bushels would be a safe average.

Oats, Barley, Rye, Peas, and Beans.—The three former have never been raised to any extent. Peas and beans, however, I should suppose, grow as well here as at any place on the globe. The amount per acre I cannot give, as there are no pains taken in the cultivation. I, myself, have raised, this year, three crops of peas from the same seed, on the same ground.

Clover and Grasses.—Not raised here, as we have an inexhaustible pasture without that trouble.

Dairy Husbandry.—No attention given to it beyond home consumption.

Neat Cattle.—We have an abundance, and the cost of raising is nothing. Such a thing as feeding cattle is not known here. Our beef is always fat stock cattle, worth $4 per head. Beeves worth $10, all, or nearly so, Mexican stock.

Horses and Mules.—Cost the same as cattle, and no more, to raise them, and they sell for about three times as much. The stock run at large in the prairies.

Sheep and Wool.—It is generally thought that wool-growing would be profitable. There are a good many persons just entering on the business, with some energy. What wool has been sold was of the coarse kind, and averaged 35 cents per pound.

Hogs.—The same as cattle; cost nothing to raise except some trouble, and there is no pork or bacon put up but for home use.

Cotton.—An average yield of cotton is about 3,500 pounds to the acre. The cost of cultivation per acre I am not able to give you correctly. We have not found out yet any successful remedy against worms; and as for improving the land, I may observe that we have not found it necessary as yet.

Sugar cane.—The average production is two hogsheads to the acre, but the net cost I am not able to give you; and we know nothing of the seed here—whether it would be better than rattoon or not.

Rice is not grown.

Tobacco is cultivated, but at how much per acre I am not able to say.

Hemp is not grown.

Turnips, Carrots, and Beets all grow finely, and turn out well.

Potatoes.—Irish and sweet, equal to any southern State.

Fruits are poor, with the exception of figs.

Manure, as already stated, under the head of "wheat," is not used at all.

Meteorology.—No correct observations have ever been kept. The thermometer (highest) has been, in August, 97°.

Before I conclude, I beg to observe, that I have raised water-melons this year from the seed; out of these melons I have now a second crop, as abundant in quantity as fine and flavory in quality and taste.

Hoping the above information may be satisfactory, I remain, sir, yours, respectfully,

ARCHIBALD McNEILL.

Hon. THOS. EWBANK,
Commissioner of Patents.

TENNESSEE.

ECLIPSE, MACON COUNTY, TENNESSEE,
September 15, 1851.

SIR: In compliance with your request I will proceed to give you a few brief statements on the agriculture of this vicinity to the best of my knowledge. Although I am not engaged in the farming business, I can probably satisfy you.

Wheat.—Guano is used as a manure on wheat crops with tolerable success. The average crop is from 8 to 12 bushels per acre. Time of sowing from 1st September till 15th October; of harvesting, May and July. There is no peculiar way of preparing seed, only to select it clear from wheat-cockle and rape; from 1 to 1½ bushel per acre. Break up, harrow, plough, or brush in from 2 to 4 inches. Ploughing rather on the increase—broadcast. There is no particular remedy for Hessian flies. Some prefer early, and some late, as a preventive. Others sow slacked lime broadcast while the dew is on; after threshing, put up in the chaff as preventive against weevil. Worth from 60 to 75 cents per bushel.

Corn.—Guano is used very much in this crop; sometimes scattered broadcast, and sometimes a common shovel on the hill. There is no estimate made per 100 pounds. Average about 35 bushels per acre; worth from 20 to 30 cents. Break up in the fall; cross-plough in the spring, then harrow; check off from 3 to 4 feet, according to the strength of the soil; drop from 4 to 5 grains in the hill. By this method you will be sure to have a good stand, viz:

One for the blackbird, one for the crow,
One for the cut-worm, and two left to grow.

It is my opinion it is much the best ground or chopped, but it is universally fed whole and raw. Your last question has never come under the consideration of our farmers, that I have heard.

Oats, Barley, Rye, Peas, and Beans.—Oats is an abundant crop; yields from 20 to 25 bushels per acre, and a dozen binds per bushel, sowing from 1 to 1½ bushel per acre. Rye and barley scarcely raised at all; not enough to make any comparison. Peas and beans only for table use.

Grass is scarcely used at all for hay. The blades of corn are used as a winter feed. Clover is sometimes sown for summer pasture, with indifferent success.

The Dairy is not used to supply any market. All made is in families; no peculiar way of treating milk; only a common log spring house below or above the spring. The common old model churn is used; big at the bottom and little at the top.

Cattle.—Three years old, cost $2 to $3; worth $4 to $6. Good dairy cows, worth $10 to $12. Not ascertained—no experiment tried that I know of. Take while small, put a common yoke on their necks, with bows, and lash their tails together to keep them from turning their necks in the yoke.

Horses and Mules.—Their growth is considered profitable by the farmers. Rearing mules till three years old, from $20 to $30; worth from $40 to $65, and on the decline. Colts, from $30 to $40, till three years old; worth from $40 to $100, and on the decline. Brood mares, breed to good jacks and horses. Give plenty of dry food and good pasture and keep them out of the wet a few weeks before foaling. Breaking: just bridle them, bounce on their backs and stick there, and there is no more trouble with them.

Sheep and Wool.—Nothing more than for family use. No experiment. Large sheep, both for mutton and fleece, are preferred; no full-blooded merinos raised. Wool is worth from 25 to 30 cents. About two-thirds to the number of ewes.

Hogs.—The common old Grazier, mixed with Hindoo breed. Good clover or grass in summer, and corn-fed in the fall, two or three weeks, (last grass not extensively raised;) from 8 to 10 bushels. Kill in November or December; when cold, salt down in hogsheads or large troughs; hang up early in the spring; smoke with good sound wood until dried, then pack down again in corn, wheat bran, or ashes, and you will have good meat.

Cotton is scarcely raised at all, only by very small patches; not enough to give any information—therefore it will pass unnoticed; also sugar-cane and rice not cultivated at all.

Tobacco.—About 600 pounds per acre; cost of raising, about $1 75 per 100 pounds; worth, for the last year, from $4 to $7, but on the decline. No improved plan known; no peculiar rotation to maintain the fertility of the land. Guano is used with good results on old land; it makes our best and heaviest tobacco.

Hemp not cultivated at all. Turnips, carrots, beets, &c., not cultivated, except as a garden vegetable for the table. Neither increase nor decrease perceivable; no improvement in the way of preparing the land known; not used among stock; no estimate made.

Potatoes are cultivated about the same as the above-named roots, except sweet potatoes. Make round hills, plant, scrape down, and hill up. Nothing more done until digging time, in September and October.

Fruit.—Neither increase nor decrease perceivable; not enough cultivated to make it profitable to the farmers, only for family uses. No exportation made; no applicable remedy discovered for the diseases of fruit-trees. No grafting of consequence; no interest taken in the grape culture or forest culture.

Manure.—No particular way, only to let it lie in where stock is stabled or penned for the winter. Plaster not used; no lime of consequence. Guano is used with good success; no particular quantity; thrown on as the strength of the ground may require.

So I believe I have given you all the information I can think of at present, but will take pleasure in communicating to you at any time, on any subject; as I would like to become a little acquainted at any rate. Or I am at your service for anything you want at any time that is within my power.

Your obedient servant,

J. H. EUBANK.

VERNON, TENN., *Nov.* 27, 1851.

DEAR SIR: Your Agricultural Circular of August, 1851, is before me. I have delayed answering the many inquiries, hoping that I would be the better able to do so after gathering up as much information as possible upon a subject that is so important. I proceed at once to give you my information, imperfect as it is.

Wheat has never been raised, only for home consumption. Surest crop is raised from the May wheat; there are many other varieties tried, but none so sure as the early May wheat; it produces from 10 to 15 bushels per acre; by its early maturity, never takes the rust. The Mediterranean has been sown in various parts of the State for several years, but never in Hickman until this year; it did well this season, being very nearly as early as the May wheat, and grows better on thin land.

There are but few of the farmers who take any interest in putting it in well; those who do are well paid for the extra labor. When we have a crop of good wheat, not injured by late frosts, it weighs about 68 to 70 pounds per bushel; but the last two crops have been poor ones.

Indian Corn is the principal crop with most of the farmers, and, where the soil is good, they raise from 50 to 60 bushels per acre; 35 bushels would not be far from an average over the county. I have done as much in the way of experimenting upon this article as any one in Hickman. Having, from childhood, been brought up to work thin land, of course it has been to my interest to cultivate it to the best advantage. The mode of culture several years back was, and is with a good many yet, to plough the land about 2½ to 4 inches deep; and, from observation, I find that in land that is the least rolling, the soil has disappeared. Land that is for corn, if stubble, should be broken up in October. Let it lie until the last of March, or first of April; break it up again; and then I use a log-harrow, about 7 feet long, with iron teeth inserted in the log 6 inches apart—this being the best harrow I ever saw used. I will give you a better description of it: The tongue, for oxen, is inserted through the centre of the log with a large mortice to strengthen it; the teeth should project back enough to let the weight of the log drag on the ground, and, the teeth being placed at the proper slope, they completely pulverize the land, and leave it perfectly smooth and finely harrowed up. The log should be of weight sufficient to mash the clods and level the ground. After harrowing land for corn, I check it at 4½ feet, and drop

3 or 4 grains in each hill. About four days after planting, if the season is fine, cross over it with a side-harrow. I plough and harrow four times with one good hoeing. If I use manure for the crop, put one shovel in a hill; it is some labor, but pays better than any I can give. The benefits of manure have been but little known in this county until within a few years; but it shows so plain upon the farms of those who judiciously apply it, that there will be but little thrown away or wasted, and every effort will be made to increase the quantity. The long, brier-top, or gourd-seed corn is the most prolific, shelling out more from a cob than any other variety.

Oats are abundantly raised. Sow, from the 20th of February to the last of April, from 3½ bushels to 1½ bushel per acre, on corn or cotton-land; and, with an ordinary season, you can make about 600 binds per acre. The small black oat is the kind used.

Peas are raised to some extent, and could be profitably raised with less labor than any other crop. I have raised 5 crops. My mode of planting is: After ploughing my corn three times, to cross the ploughing in the centre of the row *forthwith* with a small coulter; drop between the hills from 4 to 8 peas in a hill, and cover with the foot; in ten days, or as soon as the corn wants ploughing, run the bar of the plough to the peas, and the mould board to the corn; when ploughed again the other way, the peas will be of sufficient size for the mould-board; hoe out after the five ploughings; and, my word for it, in fair land, and a moderate season, you will not regret it. I have frequently sown them broadcast the last ploughing; but it is not so sure, as they are too late for a sure crop. The pea known as the cow-pea is the best, as they will lie on the ground and keep sound all the winter. I find that horses, mules, cattle, and hogs are very fond of them, and improve rapidly when well fed or pastured on them. The vine is a great addition to land; also, the Goober pea is extensively raised here, and, so far, has proved to be the most profitable crop that can be raised. The first ever raised for market was sold in Nashville in the fall of 1845. Since that time there have been upwards of 20,000 or 25,000 bushels raised within 10 or 15 miles of this place each year, and sell for from 65 cents to $1 per 22 pounds. The vine is equal to clover-hay for stock, if well saved.

Clover has done but little good in Hickman for the last two years.

Neat Cattle.—Those who take care of the young, with good shelter in the winter, can raise them, until 3 years old, for $6 each; and they are raised upon such food as would be thrown away if not fed to cattle. Worth, at that age, from $8 to $10.

Horses and Mules are raised here to some extent—particularly mules; and those that have made a business of it appear well pleased with the profits arising from the sales at 2 and 3 years old. The cost of rearing one until 3 years old does not exceed $35 or $40. Worth, at that age, from $10 to $100. I could write a page in giving my views upon the management of mares and colts; but, as every one has a way of his own, I think it useless.

Hogs.—The best breed of hogs is the Berkshire, crossed with the native stock, and well fed all the time, or grazed on clover, oats, &c.; which, with plenty of salt in the spring, is a very good substitute for yearling hogs. Pigs should be better fed. The best mode of curing bacon is to kill your pork as soon as the season will allow; put on plenty

of salt; let it remain about 5 weeks; have a good, tight house, and be sure to have it high, with a cold spell to hang in, and you will never fail to have good bacon. The best mode of putting up hams—and I have tried many ways—is to put them up early in ashes—a layer of hams and ashes—and stalks across, to keep them from touching.

Cotton is a poor article for Tennessee, and particularly this season. Average yield, about 600 pounds per acre, and is selling for $1 40 in the seed. I would say to Tennessee, Let the southern people raise it: there is not an acre of land but what can pay better in almost anything that is grown than cotton. Try it.

We have some *tobacco*-raisers in this county, and they made it profitable last season; and, with proper culture, it is a profitable crop Fresh, new land, or old, manured, does equally as well, and makes a heavier article; but it is a crop that requires an experience, to make it pay, that few are in possession of. The least neglect, and a total failure is the result.

If what I have written, after correcting the many mistakes, will be acceptable, you are at liberty to publish. The enclosed are correct answers to a part of your questions, according to the best of my judgment.

Very respectfully, yours, &c.,

WILLIAM B. EASBY.

LINE POST OFFICE, OBION COUNTY, TENN.,
October 29, 1851.

SIR: A copy of your printed Circular came duly to hand; and, within a few days past, I have had the pleasure of receiving a copy of your Annual Report to Congress, accompanied by a few packages of seed-wheat, &c.; for all which acts of kindness, intended both for public good and individual interest, be so kind as to accept my sincere thanks.

As to the many kinds of information sought by your general Circular, I with much pleasure communicate a few important facts in relation to the culture of grasses and small grain, hoping they may obtain general circulation through the medium of your Annual Report to Congress, if you should deem them worthy of a place in so important and useful a book.

In seeding new lands with *grasses* of all kinds, it is important that the soil should be prepared, without turning under the virgin, or top soil, so that the seed may be deposited in it, instead of the unsubdued subsoil. This preparation may be, by the use of a subsoil plough and harrow, or with the harrow alone, by which a better stand will be insured, and a far better yield. I esteem it of great importance to harrow all kinds of grasses and small grain in the early spring, whilst the soil is yet moist—say in the latter part of March, or very first of April. The advantages that will result from adopting this mode of culture are these: the light and air will be freely admitted to the roots, which are necessary to luxuriant growth; and most foreign growth will be destroyed—thus insuring the largest product of which the soil may be capable of producing; and lastly, the spring harrowing will break up the turf-bound condition of most meadows, and perpetuate them through many years until

the soil is exhausted of that constituent quality which produces it, and I believe through all time, if duly manured, without reseeding. From my experience, I am convinced that spring-h rowing is as necessary to the best production of grasses and small grain as ploughing is to the greatest production of corn. It must be apparent to all, that the loading or weighting of the harrow must be in proportion to the closeness and hardness of the soil, and that in light soils the harrow itself must be light, without any additional weight.

Yours, most respectfully,

P. V. MARR.

Hon. THOMAS EWBANK,
Commissioner of Patents.

KENTUCKY.

GREAT CROSSINGS, KENTUCKY,
January 21, 1852.

SIR: A press of business is not a lawful excuse for a man to plead why he has not furnished something for your Annual Report, if he professes any interest in your operations. I, therefore, at this *late day*, can only plead *guilty* of gross neglect of a plain duty.

Wheat.—Owing to the peculiar winter, a considerable portion of wheat froze out, and was consequently too thin; that which matured was genealy full and plump, and, where this freezing did not occur, made a fair yield.

Corn, in this part of the county, was unusually fine; and, although we have more stock than common in the county, (mules especially,) we will have a surplus. Some of our corn has been sold to go to New Orleans—from 17 to 25 cents a bushel having been paid.

Oats are finer than I ever knew them in this county; they not only grew taller, but thicker and heavier.

Barley.—My first crop is now green. Owing to the unusually dry fall, small grain of all kinds were sown late; consequently, my barley and wheat are not promising.

Rye has almost ceased to be cultivated.

No effort in my neighborhood has been made to cultivate *root crops* as a substitute for corn-fodder. I intended to make a trial this season with sugar beet or ruta-baga, but was discouraged by a gentleman who had tried them and failed. He recommended the common turnip as the best substitute. I accordingly sowed more seed than usual with me, with a view to use them; but, owing to the dry weather during the months of August and September, they did not succeed well. I will try them again the coming season.

I expected to give you in this the result of some experiments in reference to the relative value of raw and cooked food for hogs, and of ground and unground food for mules; but my public duties so frequently call me from home, that I cannot give that close personal attention to an experiment that its importance demands. Suffice it to say, that, after nearly two years have elapsed since I commenced the use of ground food, I am

fully satisfied that there is economy in its use. Every intelligent agriculturist must deplore the present state of things that exists in the western country in reference to agriculture. The general indifference in regard to improvement of implements, as well as the soil itself, greatly discourages the efforts of the few.

The deep-rooted prejudice against *book farming*, the difficulty of geting up a *combined* effort for improvement, and the determination on the part of some to do as their fathers did, joined to that *slothful adage*, "let well enough alone"—all render it a difficult matter to enlist the energies of agriculturists in any effort to improve. Such is the power of habit, or the influence of prejudice, that, if an effort be made to introduce improved implements of husbandry, the person making the effort is regarded as an innovator. Custom is law. "My father raised as good hogs and had as good bacon as anybody," says one, "and he always turned his hogs in the corn-field, and they staid there until he was ready to kill; and, therefore, I'll fatten my hogs in the corn field." Another uses the same remark, and concludes by saying, his father always fattened his hogs in a close pen, and he will do the same. As to the best method, such farmers are deaf. Whether it is cheaper to fatten the one way or the other, or to abandon both and adopt a different system, is a matter that such men never pry into. It is so in reference to feeding cattle. It is not a question whether a certain quantity of corn will yield more to the grower in beef, by cutting it up and feeding in the shock or grinding it in a trough; but somebody has done well at feeding cattle with cut up corn, and, therefore, it is a good business. Success in business is the criterion, and the consequence is, our farmers are constantly changing their mode of operation.

As farmers, we must for the present, and for some time to come, remain a stock-growing people. And how shall we remedy the defects of habit of which I have spoken? First, we must diffuse information; agricultural papers must be read, and your valuable Annual Report widely circulated. It has always exercised a most happy influence on agricultural operations; and its influence must not only continue for good, but increased good.

I suggest, as a means of improvement, county or district clubs of farmers, formed where they may impart to each other the results of experiments tried; of modes of culture adopted; compare the results of each other's system of feeding, with a view to the adoption of the best; and, in every way best suited in their judgment, to promote the interests of agriculture. Prejudices, under such a system, would give way; bad habits would be corrected; a healthy spirit of improvement would be cherished; and, in the opinion of the writer, the farming interest would be permanently benefited. Let the farmers composing such clubs meet once a month, (or not so frequent, or more frequent,) at some central point agreed on. Some of them might prepare essays to be read to the club; others gather statistical information; and all, in some way, endeavor to promote the interest of farmers. I throw out these hints; if you think them worth printing, use them; if not, throw the paper under the table.

With my most ardent wishes for your success in this undertaking, and a sincere desire for your personal welfare, I subscribe myself, respectfully, yours,

Y. R. PITTS.

To the COMMISSIONER OF PATENTS.

NEAR COLBYVILLE, CLARK COUNTY, KENTUCKY,
December, 1851.

SIR: In answer to your inquiries about *wheat*, I would state that I do not know that guano has ever been used in this county. I suppose the average product is about 10 bushels to the acre. Sometimes we have 25 or 30 bushels per acre, and then again the crop is almost a failure. The chief cause of the failure is the Hessian fly, or the rust. If sown too early, it will likely be injured by the fly; and if too late, by the rust. It is therefore important that it should be sown too late for the fly, and soon enough to prevent its injury by the rust. But it is impossible always to do this, unless we could tell what the weather would be after the sowing; for, if it keeps warm, although late, it will be liable to be injured by the fly. Our usual time of sowing is from the 15th of September to the last of October. The time of harvesting depends somewhat upon the kind; the early ripening kinds, being less liable to the rust, are generally harvested in June; the later kinds, in July. The average price was about 50 cents a bushel.

Corn.—The average product is between 50 and 60 bushels per acre. The cost of production, or the selling price, is generally about 20 cents. I have known men hired to do all the work of raising a crop of corn for $2 per acre. The corn land is generally ploughed as deep as it can be conveniently; after which it is laid off from 3 to 4 feet, and planted in hills. Some prefer drilling. Soon after the corn comes up, a large harrow or roller is run over it—a person following with a small rake to take off any clods that may be left on the corn; and shortly afterwards, a small plough is run as close as possible to the corn, throwing the dirt from it. As soon as the corn will bear it, the plough is again run near it, throwing the loose dirt against it, and in the hill. About this time, the corn is thinned, leaving 3 or 4 stalks in a hill, and pulling out any large weeds that may be there. After this, it is ploughed both ways, if planted in hills, still throwing the soil towards the corn, and splitting the middle of the rows; when, if the weeds have been well subdued, and the corn has grown 4 or 5 feet high, it is "laid by."

I have no experience in saving manure from a particular measure of grain; but believe that 100 barrels of corn, fed to hogs, upon 10 acres of "tired" ground, will add 50 barrels to the next year's crop. By tired is meant land that has frequently borne the same grain in successive years until the product is materially diminished.

My usual rotation is, corn, two years; wheat, rye, or oats, and clover seed; two years in clover pasture; and corn again as before.

Oats.—I consider oats the next most profitable grain to corn; upon my land the average product is about the same number of bushels per acre. I usually use from 2 to 3 bushels of seed per acre.

Grasses.—Timothy is almost universally preferred for meadows, clover for rotation, and blue-grass for pasture.

Neat Cattle.—The price of cattle varies very much as to quality; and in different years, the same kind of cattle vary much in price. Generally the cost to the purchaser is about 50 cents per month. Thus, a two-year-old steer will be worth $12, and a three-year old $18. But some are much higher, and others lower. I have no experience with Devon cattle, but much with Durhams and natives (scrubs, we call them) and some with Herefords.

I will relate two experiments that I made many years ago. I purchased 20 native calves of one of my neighbors, mostly heifers; these I spayed; and 20 heifers that were of a mixture of the Durham, Hereford, and Patton stock. They were all spayed at once, and pastured and fed together. They were sold when about 30 months old. The natives averaged about 350 pounds each, and were mostly weighed. The Durhams were sold for 750 pounds each. The butcher afterwards told me they exceeded our estimate.

I purchased 20 *four-year-old* steers of the native stock. I had raised 15, and purchased 5 mixed Durhams that were *two years old*. These cattle were all grazed together during spring and summer, and in the fall and winter they were separated and fed out of the same field, with the same allowance of corn, during the week; and every Sunday they were all turned into a lot, into which the allowance for both had been hauled the day before. At Christmas, I killed, for a beef, one out of the Durhams; so that after that time the Durhams had one-twentieth more than the natives. I sold the Durhams in April for $31 96 each; and sold the natives in May for $20 91 each. The natives were not weighed; but I sold them for the best price I had ever been offered. I never could get any offer for them until the Durhams went away. We killed an average of the Durhams, and they weighed 799 pounds. I have just sold 18 four-year old Durham steers, averaging 1,202 pounds for $66 21 each.

At the time I made the above experiment, I had no experience in feeding cattle, but asked a neighbor who had been engaged in the business which lot he thought I should make the most upon, and he said, upon the natives, as they were two years older than the Durhams. The natives fattened, but did not grow; the Durhams fattened, and grew, too, and were fatter, when sold, than the natives. Of the Durhams, there were no full-bloods, but were all mixtures; but they had enough of the Durham and Hereford blood to give them fattening qualities. Had they been thorough-bred Durhams, the result would have been greatly more in their favor.

I have usually employed one of the following plans in *breaking steers;* I first get a strong rope around their horns, and tie them by the side of the stable or barn, so that they cannot hurt themselves by getting the rope around them. They are fed there, and, after a day or two, are led off to water. As soon as they can be led, they are put in the yoke; if very strong, a yoke is used with three bows. A pair of strong oxen are brought—one on each side, and all three fastened in the yoke, and turned loose. A boy is told to drive them about in an open pasture during the day. The next day a common yoke is put on; one of the broken oxen is put with him, and they are set to work behind a pair that are well broken. If the steer is not very strong, he is taken, as soon as he has been learned to lead, and put with a well-broken ox to work. The two should be about the same strength. After having worked each of the new pair in this way for some time, they are then put together.

Wool.—Wool-growing is said to be profitable by those who are extensively engaged in it. I have found it very unprofitable. I have kept from 100 to 200 merino sheep, that averaged about 4 pounds of wool each in the fleece, which I have sold for from 16 to 20 cents per pound. This would give from 64 to 80 cents the sheep. In consequence of the low price of wool, I have reduced my flock to 50, and

am using a Cotswold buck to give me larger lambs for mutton. The coarse and fine wool sells at the same price; the coarse wool is in rather more demand, as it does not lose as much in washing, and is more easily manufactured into coarse jeans than the fine.

Hogs.—There has been considerable controversy about the relative value of the different breeds of hogs; and there have been a number of experiments made to test their fattening qualities. These experiments have been made principally between the Woburns and Berkshires; and have uniformly resulted in favor of the Woburns. The Irish grazier hogs, imported by James Letton, have added greatly to the value of our hogs. The cross of the Woburn and the Irish upon the Berkshires has greatly improved the latter. There have been various other breeds that have had their advocates. The Neapolitan improves the meat and fattening qualities of all the breeds with which I have seen them crossed; but they impart a wildness, which more than counterbalances any good qualities that may be communicated by them. The cross would be valuable to persons who keep their pigs in sties or small enclosures. I do not know that our method of raising pork is the cheapest; but it is a cheap method, which I will detail. We try to have one set of pigs early in the spring, and another in the fall. The sows are fed in the spring upon corn, whilst suckling their pigs; about one ear of corn for each pig she may have, each day. As soon as the clover is sufficiently grown, they are turned into the clover-field, where they still have a little corn. After the pigs get large enough to begin to eat corn, some is put into a small pen, into which only the pigs can get, that they may have a little corn every day, in addition to the clover. Here they stay until the rye is ripe, or the wheat has been cut; they are then removed to the rye field; or, after the wheat has been removed, to the wheat-stubble, to glean the fields. By this time the oats are ripe enough to turn upon. After they have finished the oats, they are again put into the clover field; and the apple orchard, if near the clover-field, is of considerable advantage. If there are no apples, a little corn will keep them from falling back until they are put into the corn field (or have the corn gathered for them) for fattening. The larger of the spring pigs are killed, by many persons, in the following fall, for family use. The balance, and the fall pigs, are wintered after cattle; that is, the cattle that are intended for fattening are put into a field that is in grass, and have corn hauled out to them and thrown upon the grass. After the cattle have done eating, the hogs (that had been previously turned out) are turned into the field after them. Three hogs can thus be wintered after one steer. They gather much that would be lost. March pigs, raised in the above way, killed in November, will average about 200 pounds dressed. The larger hogs are frequently sold. Our corn is generally cut up and shocked in the field, 16 hills square, or 256 hills to the shock; and one shock of good corn is enough for 10 steers a day; and 30 hogs will be well wintered after them.

Hemp.—The culture of hemp is on the increase in this neighborhood. There is no new process, except that cutting has almost entirely superseded the old method of pulling, and the roller is much more used in putting in the crop than formerly. The hemp crop ranges from 500 to 1,000 pounds per acre. I suppose the average is about 750 pounds. I make the average cost of producing an acre of hemp about $31.

Fruit.—The culture of fruit is receiving much more attention than formerly; but it is confined in this region mostly to the production of enough for family use. I think, even upon our land, that is worth $75 per acre, that the culture for stock would be profitable. My hogs derive much benefit from going into an orchard of fall and winter fruit, of 100 trees, whenever they bear fruit. I believe my hogs get more benefit than the interest upon the price of the land; and I get the greater portion, and all the best, to put away for family use. I know of no preventive of the blight. But the best remedy that I have tried for it on pear trees is to cut off the limb, and burn it.

We usually plough but once for wheat; and then, if the wheat is ploughed in, only about three inches deep. The plough is usually followed by the roller or harrow, and the seeding is done. From a bushel to a bushel and a half of seed is used. There is generally no preparation of seed. I have never seen the smut until this year. One of my neighbors had a field that was not worth cutting, and I have heard of another crop that was considerably injured by it. Wheat is not near so sure a crop as it was thirty or forty years ago; nor is the yield near as great.

Yours, respectfully,

SAM'L D. MARTIN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

OHIO.

COLLAMER P. O., CUYAHOGA COUNTY, OHIO,
January 1, 1852.

SIR: In attempting briefly to reply to some of the inquiries and suggestions in your Circular of August last, permit me to premise that, as a *practical farmer*, my agricultural labors have been confined to so few acres of ground that it would seem almost like presumption to aspire to this appellation; but, with this premonition, I will attempt to give you the result of my experience and observation in relation to a few of the leading articles referred to in your communication.

On Fruit Culture.—The cultivation of fruit is receiving, in this vicinity, (near Cleveland,) increased attention. The adaptation of our warm, sandy soil, and our lake-regulated climate, for this branch of agriculture, on the south shore of Lake Erie, throughout a considerable portion of its whole extent, is beginning to be understood and appreciated, and large orchards of apples and peaches are now yearly planted out, and the owners are beginning to realize handsome profits from their investments, and to be convinced that a much more extensive cultivation of orchards of *good fruit* will yield a fair remuneration and profit to the cultivator.

On feeding Apples to Hogs.—I have had but little personal experience on this subject; but, from the little I have had, I have been induced, within a few years past, to select scions from the best sweet apples I could find, and to graft them into many of the bearing trees of my orchard, for the purpose of feeding; but they have not yet produced sufficiently to enable me to carry out the experiment. A few years ago

when my trees yielded abundantly, I built a fence, in my orchard, around two of the trees, of common, ordinary, sour fruit, and shut up a hog, as the apples began to fall in the enclosure. There I suffered him to remain, with a slight protection from the storms, until near Christmas. On slaughtering him at that time, I found him as good, for aught I could see, as one fed in an adjoining enclosure, with the slop of the house and what corn he would eat.

A few years ago I was at Hudson, in Portage county, when a gentleman connected with the Western Reserve College there, and an extensive and practical farmer, was showing me his orchard, of some two or three acres of apple trees, situated near his house, in which he was in the habit of turning his hogs to pik up the falling fruit. During the discussion of the subject, which thefine specimen he exhibited had elicited, he assured me he had frequently fattened his hogs in that orchard from the falling fruit, and had, in that way, made more pork than he could possibly have made from the same quantity of ground planted with Indian corn. Thus, not only saving all the expense of ploughing the ground, planting, and tending the crop, but also reserving a large portion of the fruit for family use; and, in the early part of the season, making use of the grass among the trees, in pasturing his horse, before the fruit began to fall.

On Grape-growing.—In this department of agriculture, but little, very little, has been done in northern Ohio. The subject is but little understood, and the cultivation of the grape has been almost entirely neglected. Go through the Western Reserve, with its millions of acres, comprising the whole northeastern section of our State, and I very much question if, among all our worthy and industrious farmers who occupy it, you find one in twenty who has a grape-vine in his garden or on his farm, unless a native of spontaneous production; and if, perchance, you do find, here and there, one solitary individual, in what condition will you find it? Why, if fortunately, or by mistake, planted in a situation favorable to its existence, it is tangled and matted together with the accumulated tendrils and laterals of a dozen years' growth, and, in appearance, much resembling a huge brush-heap overrun with brambles; and but that kind Nature, with a more liberal hand than its unfortunate proprietor, (as if to intimate to man the propriety and necessity of regular and liberal pruning,) had assumed the neglected duties of the vinter's art, and repeatedly curtailed its rampant growth, by killing off and reducing its labyrinthine excess of innumerable and crowded branches, and thus affording room for new bearing shoots, it would long since have ceased to produce a single cluster of fruit.

In the gardens of our citizens at Cleveland, and in and about our larger towns and villages, more attention is paid to the cultivation of the grape; but in all this section of country, I know of but two collections of vines that are entitled to the name of vineyard—one is at or near the mouth of Vermillion river, on the bank of Lake Erie, containing some 2½ acres; the other is in this immediate neighborhood, some 5 miles from Cleveland, and containing about 3 acres: the first of these mostly of the Isabella and Catawba varieties.

Wine.—On the manufacture of wine, what shall I say? That, behind the age as we are in the culture of the grape, compared to our Cincinnati and southern friends, yet the manufacture of wine falls far in the

rear even of our grape cultivation; and I might, perhaps, have left the space assigned to this subject a blank, but for a consideration of the importance the subject is assuming in southern Ohio, and my conviction of the suitableness of our location and climate for the successful growth of the grape, and our ability to compete successfully with our Cincinnati friends. Our light soil requires none of the heavy outlay for trenching which I have seen practised in the heavier soils on the Ohio river; and the extensive process of terracing their steep, stony side hills is obviated by our smooth, level plains. Our few vines, as far as I have observed them for the past 3 years, have yielded as abundantly as theirs; and we are not, I think, so subject to "the rot," of which they complain.

The influence of our lake is highly beneficial; retarding vegetation some 2 or 3 weeks, we often escape the late vernal frosts so fatal to the fruit prospects of our neighbors. The difference which this would have occasioned in the length of our season is abundantly made up by the mild influence exerted in the fall, and by the large body of water composing our lake, warmed up by the summer sun, dispelling the autumnal frosts in its vicinity, which, for several weeks previously, have cut down the vegetation only a few miles south of us in the interior.

In deciding the relative advantages of northern and southern Ohio for the cultivation of the vine, an important question will be, What is the comparative value of the grape of these different localities on light or humid soils? I do not know that this question has been decided by subjecting the must of each to the test of the saccharometer. I could not find the instrument in Cleveland last fall; so I ventured to adopt the substitute suggested by Mr. Longworth, of Cincinnati, (a fresh-laid hen's egg;) but my experiment was not altogether satisfactory, being rather too much like guess-work, and strongly reminding me of the expedient resorted to down south by a man who, to weigh his hog, for the want of scales and weights, made use of an adjusted plank, on which he balanced the hog with a pile of stones, and then he guessed at the weight of the stones.

The saccharometer may test the saccharine properties of the grape; but that is but one of the properties it should possess. I find, from my varied but imperfect experiments, that the amount of aroma, giving fragrance and flavor to the wines, varies very essentially in the different varieties with which I have experimented, and that, though one may be deficient in one principle, it may add much to the flavor and value of wine made from a richer and sweeter variety; the value of this property can only be proved by the practical use of the variety possessing it.

Wine-making is yet in its infancy in the United States, and this, with other matters connected with the subject, has yet to be examined into and tested by the future experience of vine-growers and wine manufacturers.

Very respectfully,

H. H. COIT.

CLEVELAND, OHIO, *September* 30, 1851.

SIR: The peach-tree has been gradually losing its health and vigor during the last 50 years. In sections of country where it was formerly

healthy, it is now only raised with extra care. This diseased condition began to show itself coincidently with the appearance of the *Ægeria exitiosa*, or *Borer;* and has progressed as that depredator has increased in numbers, leaving no room to doubt that the one has, in a great measure, been produced by the other. A successful remedy has long been a great desideratum in the peach-producing sections of the Union. During a late tour in New England, I had the satisfaction to find that such a remedy had been discovered by E. M. Pomeroy, esq., of Wallingford, Ct., After examining the whole subject, I came to the following conclusions, to wit:

1st. That Mr. Pomeroy's remedy is effectual in preventing the deposition of the eggs into the crown of the roots by the perfect insect.

2d. That it is equally certain to destroy the young larvæ already lodged in the bark of the tree, near the roots—the only point they ever attack. It accomplishes this by cutting off the means of respiration.

3d. That, after it has been thoroughly employed on a diseased tree for a year, the tree is sure to recover its health and vigor.

4th. That the cost of material and the amount of labor required in the application are so limited that neither item will ever enter into the calculations of one in possession of a valuable peach orchard.

5th. That the discovery of the use of this remedy will be of incalculable pecuniary benefit to those parts of the United States in which the peach is a staple crop—as in New Jersey, Ohio, New York, and Maryland.

I beg leave to refer you to an article on "*the Premature Decay of the Peach tree*," which will probably appear in the December number of the Horticulturist, by Mr. Downing. Mr. Pomeroy will probably lay the subject of his remedy more in detail before you.

I am, sir, very respectfully, yours,

JARED P. KIRTLAND.

Moore's Saltworks, Jefferson County, Ohio,
December 10, 1850.

Sir: It is with pleasure that I now proceed to make a report of matters relating to the agricultural interests of this vicinity.

I have had the object of your Circular under consideration for some time, and have availed myself, as far as practicable, of every opportunity, both by personal observation and the opinions of intelligent individuals, to arrive at some degree of precision on the various subjects proposed. I fully believe the agricultural portion of the community, taken in mass, are inferior to none in all those moral qualities that characterize the noble of the earth; but I must confess that, in analytical disquisitions, or subtle and detailed calculations of profit and loss, even in our farming operations, we, as a class, are sadly deficient.

I rejoice in the existence of the Office of which you are Commissioner, and fondly hope the salutary and beneficial influences arising therefrom will be speedily and widely extended. I consider the agriculturists of the nation the only absolute producers of wealth—all others are consumers; and, if this be true, it would seem to follow that to advance and

stimulate agriculture should be one of the first and highest efforts of our national legislature. Your Office, it is true, sends forth annually a flood of light, which, to the agriculturists of the nation, is valuable beyond estimate; but the means at your disposal are, by no means, commensurate with our wants. Hundreds of agriculturists, I doubt not, are entirely ignorant that any such Report is made; and, of those who do know it, few, comparatively, can obtain it. I speak advisedly, and from experience, on this subject. I have annually sought this Report for the last fifteen years through my immediate representatives, and have, during that time, received two copies, and many others have been equally unsuccessful. I say, then, let the agriculturists of the nation speak out, not only through their public monthly journals, but, with your permission, through your Report, and tell our public servants what we desire. Pardon my long introduction.

Wheat.—The principal variety cultivated here is the blue-stem. Other varieties have been introduced from time to time; none, however, thus far, have taken precedence over it. Fallow ground is deemed most certain to insure a good crop; many, however, succeed well by sowing on a clover-lay, with one ploughing; and this method is gaining favor. The time of sowing is from the middle of September to the middle of October. Fifteen bushels may be set down as the full average per acre. In the eastern and southern parts of this county the lands are more fertile, and, I presume, the yield is greater. For the last three years the fly has given us but little annoyance. In seasons in which the fly abounds it is deemed a great misfortune to be in close proximity with neighbors who follow the old skinning system in farm management. When the fly abounds, or is apprehended, it is advisable to sow no ground which is not in a high state of fertility; and this is to be cultivated in the best possible manner. Good farmers and their fields are more than a match for the fly; while they who are more slovenly and less energetic are compelled to mourn over what they consider their misfortune, but never once dream that they have invited and encouraged the ingress of these marauding hosts.

Corn.—The kind most highly esteemed here is a large, yellow, fourteen-rowed variety. The probable average of the neighborhood is 40 bushels per acre. On our bottom lands, 50 to 75 is common. Our best farmers prefer a clover-lay or old meadow; and on this, unfermented manure, made the preceding winter, is applied, and turned under with the plough. The ground is then well pulverized with the harrow, and marked out and planted. For the further cultivation, the harrow and cultivator are the proper implements. In sod ground, intended for corn, in which the cut-worm is apprehended, winter ploughing may be advisable; and this practice is doubtless attended with other advantages—the soil being thus exposed to the pulverizing tendency of the winter frosts. Under this system the manure is retained and applied to the wheat crop. My own practice corresponds with the first method; and, to avoid the cut-worm, I delay turning over the sod to the very eve of planting. By this time the grass has started, which, being inverted, attracts the worm, and furnishes it with subsistence until the corn is out of its reach, or death renders it no longer formidable. By this method I can use my long, coarse, unfermented manure to what I consider much better advantage. Corn is a gross feeder. There is but little danger of over-feeding or over

stimulating this plant. It revels in the ammonia emitted from the decomposing substances underneath it; and, after maturity, it leaves the manure in good condition for the succeeding crop. By this method I avail myself of the benefit of the manure one crop in advance of those who pursue a different course. I am not aware that any close, careful, and accurate experiments have been made in this vicinity, testing the difference between feeding corn whole or ground. I do not, however, entertain a doubt that the preference is decidedly in favor of grinding; and if cooked, so much the better.

Oats.—Oats very frequently follow corn as the succeeding crop, and, if it stands erect until it matures, a large crop is generally obtained. It is sown as early in the spring as weather and a proper tillage of the land will admit. Quantity sown per acre, 2 bushels; average yield, 40 bushels.

Rye.—Rye is not extensively cultivated; but to those engaged in sheep husbandry its importance, I apprehend, is not duly appreciated. It should be sown last of August or first of September; one bushel, or, if seed be abundant, one bushel and a fourth, may be sown to the acre. Early the ensuing spring the weak of the flocks may there obtain an abundance of succulent food at the very time it is so greatly needed, and cannot be obtained anywhere else. This timely precaution by sheep owners generally, would annually save thousands of those valuable animals a lodgment in the bone-yard.

If the crop is intended to mature, the sheep should be removed the first of May; but if the crop is not the object, the field is in fine condition for corn, and may be turned over and planted. I consider the pasture ample compensation for the previous labor of seeding. My own practice is to let the crop mature, and, unless the season is extremely dry and unfavorable, the depasturing is no detriment to the crop I believe rye the least exhausting of any of the white crops; and I generally find clover and other grasses to take more certainly, and grow more vigorously, with and after this grain than any other.

Clover and Grasses.—Seeding down lands with clover and other grasses, whether for mowing or pasturage, is now considered indispensable. The average yield of hay is about one ton and a half per acre. Clover and timothy have the preference here, either for mowing or pasturage; one gallon of clover and one of timothy seed I deem sufficient for seeding an acre. I may here remark that timothy succeeds much better when sown early in the fall, and, if sown with fall grain, should have the last drag of the harrow.

Cattle.—The price of cattle when three years old ranges from $12 to $15. I have no hesitation in saying the cost of rearing is several figures above the sale; and were it not for the benefit derived by cattle in breaking down our straw piles, and adding to the manure heap, I presume few would be reared.

Sheep and Wool.—"Is wool growing profitable?" At the average price of wool for the last ten years, I do not consider wool-growing profitable; nevertheless, it is true, that some men, by assiduity and perseverance, have rendered their flocks a source of profit. The cost of producing a pound of wool will materially vary in different locations, always regarding the price of land and other contingent circumstances. The average price of land in this vicinity is about $20 per acre, and

much of this extremely hilly and broken, entirely precluding a regular systematic rotation of crops; and from this cause much of our lands remain permanent pastures, or are broken by the plough at long intervals.

From considerable experience and much reflection, I am fully satisfied a pound of three-quarter-blood wool cannot be produced here under 33⅓ cents; this price merely covering cost, and yielding no actual profit to the producer; and in those neighborhoods or sections of country where land is more valuable, the production of wool advances proportionably with the price of land; and if the producer is compelled to sell at 33⅓ cents, he is, in my estimation, "working for nothing, and finding himself." I consider the major part of the lands of this and the adjoining counties, under judicious management, well adapted to sheep husbandry, and, under a more favorable state of things, would very soon double or treble the present production. I trust I shall not be considered as entering on either enchanted or forbidden ground in making one or two observations which here force themselves upon me. In the Report of Commerce and Navigation for the last year, I find the wool imported amounts to over 17,869,000 pounds, at an average price of less than seven cents per pound. A considerable amount of these wools come from Buenos Ayres, or the Argentine Republic, and the adjoining States, which is probably the best wool-growing region in the world. The long, rough, coarse Chilian or Valparaiso wools, and all of a similar quality, cannot supplant or materially affect us. But such is not the case in regard to the wools grown east of the Andes. These are emphatically rival wools, and, when burred and cleansed, come to the cards 10 or 12 cents below our domestic wools of similar quality. The present easy terms of admission of these wools invite foreign rivalship and competition, and we are unceremoniously dogged out of our own market, or compelled to receive prices actually below the cost of production. This I believe is wrong.

The sheep of this and the adjoining counties are of the merino family, and for the last few years have been approximating to the Saxon variety. We feed our sheep about four months of the year—a ton of hay, or its equivalent, for ten full-grown sheep, is about a fair allowance. Our flocks do not generally average more than 2½ pounds per head. A ton of hay does not, in my estimation, represent or produce over 6 pounds of wool. The manure, however, is an item which should always be kept in view. Those who reside in the locality of a hay market will find it more profitable to sell their hay and purchase their manure than to transform it into wool. On lands not costing over $20 per acre, hay sold at $5 per ton pays a reasonable profit.

Hogs.—The best breed of hogs in this vicinity is bad enough. The Chinese, which is the only decent animal in the hog line I have ever seen, has been frequently introduced; but those roaming hordes of razor-backed alligators which everywhere abound, soon manage to steal a march, not only on us, but also on their less amorous male competitors, and thus transmit their own depravity in their offspring representatives, involving not only chagrin and vexation to the owner, but a ruination of the breed. One of the greatest obstacles to the improvement of farm stock here arises from those hordes of worthless animals turned out by their owners, often with small profit both to the animal and owner, and always and absolutely a curse to the whole neighborhood. The remedy for this is the enactment of a law prohibiting animals running at large, localizing it to

meet the wants and interests of the people. But the legislators of Ohio view this as a delicate subject; peradventure, its support might involve the loss of one or two votes at the next election, and consequently the bill is laid upon the table, there to sleep the sleep of death.

It is my opinion that but little pork is produced here at a less cost than 8 cents per pound, and consequently it is a losing business. The cheapest method of producing pork with which I am acquainted, is to procure the Chinese breed of hogs, and give them a good clover field for summer pasturage. This, in connection with the slops of the kitchen and offal of the dairy, will make quite respectable pork, at a much reduced cost.

Potatoes.—The only variety in this neighborhood which has outlived the potato disease is the red Meshanocks; and these, at different times, have been on the very threshold of final departure. The past spring I selected three spots of land—No. 1, a virgin soil, without manure, a gravelly loam, but quite fertile; No. 2, a strong clay loam, highly manured; No. 3, soil almost literal sand, but fertile. At the time of digging, one half of those on No. 1 were grievously diseased, and cast out On No. 2 the disease gave sufficient indications of its presence, but not so malignant. On No. 3 there was no sign of disease. Further experiments are necessary before reliance can be given. I shall continue my experiments next season. My own opinion is, that the disease is entirely of atmospheric origin, which is not yet comprehended or understood, and that certain peculiar characteristics of the soil only have the tendency to develop it.

Fruit.—Cultivation and improvement in varieties of fruit are everywhere progressing. The time will soon arrive when Ohio will be second to none, either in the quantity or quality of its fruit.

In promoting the agriculture of the nation, you are engaged in a great and noble work; your labors are appreciated by our most learned and advanced farmers, as well as by your humble and most obedient servant,

ROBERT GEORGE.

Hon. Thomas Ewbank,
Commissioner of Patents.

St. Clairsville, Ohio,
September, 1851.

Sir: Mr. A. W. Florian Genin, of this county, has been some six or eight years trying to get new varieties of the *pear* by planting the seed of the Seckel pear, and budding, in the first and subsequent seasons, from the sprouts of this seed, into the quince tree In this way fruit is got from the seed on the fourth or fifth year after planting it. Most of the fruit yet obtained from the process is bad, or indifferent; but this fall one of these buds presented a good fruit, more luscious, but not better, perhaps, than the Seckel itself.

A pawpaw of the best flavor, mixed with the Seckel pear, would give some notion of its taste; it is a little larger than the Seckel itself, and both it and its leaf are more elongated than that of the Seckel.

The same gentleman had, in the spring of 1849, some 600 flourishing *peach trees*. In the summer following he commenced digging them up and burning them as fast as he discovered symptoms of the yellows. There are now but 80 or 90 trees left, and these are the portion least cultivated. He refers me to facts, which show that, in proportion to the *restraint of their growth*, they *have escaped the disease*. A part were manured and ploughed with corn and potatoes; these were first affected. A part were in grass, in rich soil, and leached ashes at times spread some four feet around the body, stifling the grass; these grew a little slower than the trees in the ploughed ground, and were the next diseased. Some were set out in grass ground of poorer soil, and were but once given ashes—about a peck of coal-ashes. These still survive. A few small ones among them were burned with the first parcel for the yellows; but he has no doubt they had the disease when he set them out. Probably *rapidity of growth* predisposes, or rather exposes, both animals and vegetables to disease. Whether the trees that survive will escape in the end, remains to be seen. The last remedy heard of in this region, is the *driving of a nail into the tree*, just above the ground, horizontally, in a north and south direction. The *on dits* are favorable, but need proof. Mr. Genin, whom I have seen since writing the last sentence, tells me he has driven the nail into about three fourths of his eighty trees yet remaining, and thinks some proof of its efficacy has fallen under his notice. Mr. George Anderson, of St. Clairsville, drove nails in May, 1850, into trees affected, and they recovered; also, Mr. Henry Scovern. Both claimed that there were *no worms* at the roots, when their sickly aspect attracted attention.

Meteorology.—Mr. Joseph Harris, a tin and coppersmith, of St. Clairsville, has permitted me to use a record he has kept since September 8, 1849, of the fall of rain and snow, and the degrees of temperature. He reduces the snow to water, and treats two inches of snow as equal to one inch of water, as a general rule.

From this record I find the average temperature at St. Clairsville, at dawn of day, from 1st November, 1849, to 1st November, 1850, to have been 40.39; 1st November, 1850, to 1st November, 1851, 46.21; and at 2 p. m. for the latter year, 60.68—and the depth of rain for same year, 47 inches; and for the last 8 months of the former year, $34\frac{9}{16}$ inches. The lowest temperature of the first year was 4° below zero, on the 5th of February, 1850; and on the second year, 4° below zero, on the 31st of January, 1851. The highest was 82° on the 20th September, 1851; and 74° on the 7th of July, 1850. This lowest and highest refer to early morn. He did not commence recording the temperature at 2 p. m. until July, 1850.

I have compiled the following table from the record:

Table showing the fall of Rain and Snow, at St. Clairsville.

	Rain and snow.	Average at sunrise.	Av'age at 2 p. m.	Highest.	Day of month.	Lowest.	Day of month.	Whole No. of degs. in each month of this year in the order stated.	Whole No. of degs. at sunrise.	Whole No. of degrees at 2 p. m.	Remarks.
1849.	*Inches.*										
November	.....	42.33	.....	62	7	32	21	1,270	1,169	1,632	
December	.....	27.03	.....	51	20	7	25	838	894	1,128	
1850.											
January	.....	29.61	.....	54	25	5	1	918	925	925	
February	.....	26.60	.....	48	9	4	5	755	971	971	
March	4 1-4	34.77	.....	59	16	6	4	1,078	1,245	1,245	
April	4 1-16	35.43	.....	57	27	24	14	1,063	1,257	1,257	Peaches blooming on 27th.
May	4 1-8	46	.....	64	29	36	2	1,436	1,650	1,650	Frost on 21st. Bees made no honey the last fourteen days of May.
June	7 1-8	58.60	.....	70	29	43	1	1,759	1,791	1,791	Frost on 1st. The last twenty-seven days of June good for bees.
July	7-8 & 1-16	46	88.16	74	29	62	7	1,424	1,956	1,956	Wheat cut 11th to 18th: rather more than an average crop. Bees stopped making comb on 17th, but continued to fill it for ten days. 21st they commenced killing drones; 31st still killing.
August	4 5-8	35.22	79.96	72	20	56	27	1,092	1,895	1,895	From the 10th bees are living on their winter stock; cold.
September	4 3-8	55.50	74	72	26	47	29	1,665	1,752	1,752	
October	5 1-16	43.38	56.98	65	17	32	21	1,345	1,362	1,362	
	34 9-16							365)14,743(40 39-65	16,867	21,925	
November	3 1-16	38.96	54.40	59	28	20	17				
December	7 1-8	28.83	36.35	36	12	16	14				
1851.											
January	2 5-8	29.83	40.83	47	4	*4	31	.....	.....	.....	On 30th 1° at sunrise; 9° at 2 p. m.

February	5 3-4	34.67	46.17	56	24	7	1				
March	2	40.16	54.61	60	31	18	3				
April	4 3-16	41.90	62.40	59	1	27	12				
May	5 10-16	53.22	71.19	68	28	29	2				Frost on 24th, 2d, and 7th. Ice ¼-inch thick on 2d; thunder on 12th and 18th. 31st cold and rainy.
June	2 15-16	59.70	76.83	73	29	48	14				On 28th 90° at 2 p. m.; on 29th 88° at 2 p. m.
July	3 3-8	63.09	65.96	80	4	54	5				On 4th 73° at 2 p. m.; on 26th 94° at 2 p. m. 31st July dry. Bees eat last two days seven pounds, commencing on winter stock.
August	3	61.12	80.86	70	17	48	28				On 31st 53° at sunrise; 90° at 2 p. m. Dryest weather seen in ten years.
September	4 7-16	58.40	69.23	82	20	26	25				Little frost. On 11th 99° at 2 p. m.
October	1 7-8	43.96	61.32	55	29	23	27				On 7th 80° at 2 p. m.; on 9th 82° at 2 p. m.; on 20th 72° at 2 p. m.
	47										

* Four degrees below zero at sunrise; seventeen degrees above at 2 p. m.

Mr. Harris has many bees. He numbers and weighs his hives. When his bees swarm into one, he weighs it again, and thus finds the weight of the swarm. He afterwards occasionally weighs the hive, to ascertain whether the stock of honey is increasing or diminishing. He thus finds they are driven, at times, in the summer, to resort to their winter stores, and can spare no honey to the lords of creation, consistently with their own preservation.

His thermometer is in an open shed, without sides, protected by a roof from the sun; the air has free circulation through the shed.

I would suggest that the growths which may be counted in the large trees indicate, for hundreds of years back, the degree of dryness and wetness of seasons. *One* tree, as it might at some period have been in a diseased state, would not be conclusive. I counted one that showed that this region had suffered from drought for several years in succession, some 130 years ago. I did not seek to corroborate it by the testimony of other trees. The years 1816 and 1817 were very wet and cold; count back from the surface to those years, and you will find the growth of those years larger than most others.

Apples.—I have in my orchards above four hundred apple trees, of natural fruit; there are but two of them which I deem worth propagating by grafting; and the best of these two attracted no particular notice for six or eight years after I came into possession of the orchard. Good fruit, like good books, may exist some time before it is appreciated. I call it the ivory-sour, from its whiteness and agreeable acidity; it has a flavor all its own. When it is peeled, and cored with a tube, and the cavity made by cutting out the core is filled with loaf-sugar and then baked, it delights the eye by its whiteness, and the almost transparency of its substance, as well as the taste by its flavor. The first settlers here mostly raised apples from the seed; and thus produced many good varieties that will probably pass away, because not sufficiently brought into notice to be propagated. One that would suggest practicable measures to preserve them would deserve to be made chairman of a city agricultural society. A new apple is viewed in the market with distrust; hence, for exportation, that apple is best which is best known. The Newtown pippin has both fame and superior qualities. The Putman russet, the white red streaked Vandervere, or straight-whip, and Long Island pippin, I value, in the order named, as well-known and that keep well. The Gates, Rambo, bellflower, and Rhode Island greening, have more delicacy of constitution, and some seasons will not keep well; and hence nurserymen hesitate to recommend them as winter-apples; but in years of *large crops* of fruit—of all kinds—indicating the absence of palsying late frosts, excessive cold, or drought—these varieties may be relied upon for keeping until February, March, and May.

Last year I had Rambos and Gates through the whole of May.

Respectfully, yours,

THOS. H. GENIN.

Hon. THOS. EWBANK,
Commissioner of Patents.

KELLEY'S ISLAND, NEAR SANDUSKY CITY, OHIO,
November, 1851.

SIR: In answer to your Circular relating to agriculture, I would say, the staple crops of this township are wheat, corn, Irish potatoes, and fruits; the principal of which are apples, peaches, pears, quinces, cherries, and grapes.

Wheat.—Wheat is usually raised here by once ploughing, sowing one and a half bushel of seed per acre, and harrowing; little or no manure being used. The soil is a limestone clay; two or three crops are usually raised in succession on the same ground; then planted to corn, or seeded to grass or clover, for two or three years; costing about as follows (raised after corn, the corn being cut and removed from the land):

One day, man and oxen ploughing, (per acre,)	$1 25
One and three-fourth bushel seed	1 56
Half day sowing, harrowing, and drawing, say	56
One and a quarter day harvesting and housing, say	2 00
Threshing	2 50
	$7 87

Usual yield, 25 bushels; costing about 31¼ cents per bushel. Many years the cost is not over 24 cents; but 31 cents may be called a fair average.

Corn is usually raised, or planted, after two ploughings; unless it is on sward. Expense, beginning on sward:

One day, man and two yoke of oxen, say	$2 50
One day planting, man, seed	1 00
Two days weeding	1 50
Husking and cribbing, two days	1 50
	$6 50

Yield, 60 bushels per acre; costing about 10½ cents per bushel for the labor; calling the stalks worth as much as the cutting up and shelling the grain for market. To the next crop must be added, man and horse, ploughing, say $1 50; making the cost about 12½ cents per bushel; seldom exceeding that amount.

Potatoes require two days' work, per acre, more than corn, in planting and cultivating:

Six to eight bushels seed, worth in the spring, say	$5 00
Two days' labor, planting; three days harvesting	3 75
Cost of corn	8 50
	$17 25

Costing, housed, 12 cents; price, for the last season, has been 50 cents per bushel. I plant, for winter use, from the 20th of June to the 1st of July. Our frosts hold off to about the 1st of November. When planted so late, I have never had them rot.

I esteem the Mashannock and pink-eye the best summer and fall potato; and a kind of black potato, that I have not seen raised elsewhere, the best for winter and spring; being very prolific; yielding one half more, or double that of the other varieties; and are excellent keepers. The red pink eye and English white are favorites with many; yielding better than the pink eye and Mashannocks, and keeping better.

I have been using the subsoil plough the last three years, with the most satisfactory results; proving it a much cheaper method of improving worn land than manuring. I will give one experiment, as follows:

Lot $6\frac{3}{10}\frac{3}{0}$ acres, seven years under annual cultivation, to wheat, corn, or potatoes, without manure; crops growing lighter. For eighth crop, ploughed with *subsoil* plough, one yoke of oxen; after the furrow-plough, planted corn; light from neglect in hoeing; fine crop of weeds. Ninth crop, ploughed same manner the other way of lot, somewhat deeper than before, with both ploughs: crop improved; fed out without being measured; corn cut off 20th September 1850; wheat sowed without ploughing:

One day sowing	$1 00
Two and a half days, man and team, harrowing and drawing	3 13
One day digging around stumps	75
Yield, 241 bushels, costing 2 cents	4 88
Add seed, nine bushels white flint, say	9 00
Costing less than six cents per bushel	$13 88

The cost of sub-soil ploughing, previously, would not exceed 2 days per acre; man and one pair of oxen, $2 50 per acre; being much cheaper than hauling manure equivalent to it from the manure-yard to the land.

This year, after the wheat was off, I again ploughed the same lot with two pair of oxen, No. 5 plough, as deep as it could go, say 12 to 16 inches, making a mellow soil of that depth, and throwing much of the sub-soil on top; again sowed it to wheat about the 1st of October, 1851. The result will be seen next year. Various kinds of wheat have been tried. The Genesee white flint has the most and strongest advocates, both for yield and quality.

Grapes.—Much attention is being paid here to the grape—the fruit never being killed by frost in spring or fall. It ripens perfectly every year. The Catawba and Isabella are the favorite varieties, being hardy, full and constant bearers, and making wine of superior quality. The vine is traced on trellises (made of red cedar) set from 6 to 8 feet apart. The plants being from 3 to 5 feet in the rows, the expense of setting out and preparing an acre for 3 years, at which time they begin to bear, is from $100 to $150. When in full bearing, say 6th year and after, 200 to 300 bushels is a fair crop; worth $2 per bushel for wine. The annual cost of cultivation being from $50 to $75 per acre, yields a greater profit than anything a farmer can raise.

ADDISON KELLEY.

Hon. THOS. EWBANK,
Commissioner of Patents.

BELLEVILLE, RICHLAND COUNTY, OHIO,
November 20, 1851.

SIR: In compliance with your request, as contained in your Circular for 1851, I embrace the opportunity of giving you such general information as I am in possession of in relation to the improvement of agriculture and the exportation of products from this county.

The articles of export are wheat, flour, corn, flaxseed, clover-seed, dried fruit, (apples and peaches,) horses, cattle, sheep, hogs, bacon, pork, lard, beef, tallow, butter, and cheese. Potatoes thrive well here, but there is not more cultivated than for home consumption.

Wheat.—This grain is cultivated to considerable extent, and produces well; its average yield with me is between 20 and 26 bushels per acre; and it will give that yield throughout the county, if the land is well cultivated. My time of sowing is from the 8th of September to the 1st of October, and time of harvesting from the 5th to the 20th of July. My manner of culture is to plough down a heavy crop of clover the latter part of July; I then harrow it well. Some use a heavy roller first after ploughing, and before harrowing; let it lie till 6 or 8 days before seeding, then cross-harrow again. At seed time, I sow the wheat and harrow twice, or plough in with a shovel-plough or a cultivator. The wheat drill is coming into general use, and I think it a very elegant manner of putting in our wheat; there is an increase in the quantity of wheat, owing perhaps to a more thorough manner of its cultivation. My manner of rotation is a crop of wheat on a clover sod; the next year a crop of corn; the next a crop of oats, and again set to clover.

I have no remedy for the Hessian fly or weevil, except late sowing to prevent the Hessian fly, and early sowing to prevent rust or weevil. The average price the past season, in Belleville and Mansfield, has been 60 cents; the present price is 50 cents. The best kind of wheat we have is white blue stem and whig wheat: the former a beautiful white berry, and the latter a red berry, with a very thin bran, producing beautiful white flour. Both varieties weigh from 60 to 66 pounds, and are much sought after in the market.

Corn.—No guano is used as a manure in this part of the State. My average crop is about 35 bushels per acre. Last year my crop was 60 bushels per acre; season was very good. This year my crop has made 32 bushels per acre. This season was very poor for the growth of corn. My manner of cultivation is as follows: In May I plough my ground, and harrow it once; I then turn round, furrow it out 3½ feet each way, (always ploughing from 6 to 8 inches deep;) drop from 3 to 5 kernels in a place; cover it well 3 inches deep; plant from the 15th to the 20th of May. At the time of planting, I roll my corn in plaster. This causes the corn to come up and grow very fast, and never to turn yellow. I then go through it twice with a cultivator; I then go through twice with a shovel-plough, the last time going three furrows in a row. I then lay it by till the corn begins to be getting hard. I then top it; set the tops up till it is cured. When the corn is fit, I husk it on the stalk, turning stock in to eat it up clean, and they will fatten on it. Through experience, I find that at least one-third of a saving may be made by having the corn ground and cooked both for beef-cattle and hogs; but the price of pork and beef in this country is so low, that it will not pay for this trouble.

Rye, Barley, Peas, and Beans are but little cultivated in this county for export.

Oats.—Great quantities raised; produces well, and is a profitable crop for feeding horses. I sow 2½ to 3 bushels per acre; product, from 30 to 50 bushels per acre.

Clover and Timothy, and their Seeds.—Clover is sown for pasture and the renovation of the land, and for seed. When intended for seed, the first crop is mown for hay, which crop will average 2½ tons per acre. This crop is cut in the first part of June. The second crop is let grow for the seed, which is cut in September, and produces from 1½ to 2½ bushels to the acre. Clover makes the best pasture for horses of all grasses, but not so good for cattle or sheep. The hay is good for wintering sheep, and horses do very well on it; but cattle have no relish for it. Clover is mostly used in this county for the renovation of land.

Butter and Cheese.—As to cheese, there is but little made; none for export. As to butter, there is considerable made and exported; but the yearly average product of butter per cow is something I have not experimented on. From observation of my own cows, I think a good cow will make 12 pounds per week, allowing her to give milk nine months in the year, which would make 432 pounds in the year.* Ten cents being the price of butter in Belleville and Mansfield, will make the value of the butter from the cow in one year, $43 20; but the cow must be well fed during the year.

Neat Cattle.—Cost of rearing till three years old, $6 a year, making $18; price at that age, from $16 to $24; value of dairy cows, from $12 to $20 in spring; but in fall there is no demand for them. The beef fattened in this county is made principally on grass, and on corn ground and fed dry. The amount of beef made by one hundred pounds of corn I cannot tell; for I have not made the experiment. But few oxen are worked here, and I can give no information as to breaking steers to the yoke.

Horses and Mules.—Of mules there are but few raised. Rearing horses is the most profitable business the farmer can pursue. On no kind of stock that we rear in this county can we make more net profit than on horses. The expense of rearing horses till three years old is $12 per year, which will make $36. There is no particular method of taking care of the brood mare; we put to the horse in the months of April, May, or June—working them moderately until the time of foaling. We let the colts run with the mare till five months old; we then take them from the mare and put them in a close stable till they forget their dam—feeding them, during this time, one-half gallon morning and evening, with good hay. We then turn them out in good pasture, and give them their usual quantity of oats till spring. They are then put to pasture, and kept there till cold weather. They are then fed their gallon of oats per day with good hay, and so on, till they are three or four years old. At five or six we think they are ready for sale, when we get from $70 to $100 per head. To break them, we commence when they are two or three years old, by putting gears on and leading them about, to accustom

[* A cow well fed, and a good milker, will give 200 pounds per annum.]

them to the jingling noise. We then hitch them into a two horse wagon, drive them for the first half day, then load in light, and increase until you have them properly broken. Keep them at light work till four years old, when they may be rode and broke to the saddle, and put to ordinary work.

The best stock of horses for all work we have in this county, and adjoining counties, are *Thunderbolt*, *Eclipse*, *Shylock*, and the *Bell-founder*. There are many other fine horses, but these I consider the best and most sought after by eastern drovers—particularly the Thunderbolt stocks; they are of good size, very active, and spry. They are very high mettled, yet easy to govern. They are the fastest trotters, and cannot be beat as walkers. They sell here at from $10 to $20 more than any other horses reared in this county.

Wool.—Wool is considered the most profitable business of the farmer by some, even as much so as that of rearing horses. This may be so, but my choice is the horse for profit. However, keeping such sheep as will produce fine wool is profitable; and it is allowed to be a good business to rear them for mutton; but slaughtering sheep ought to be discountenanced by every well-wisher of his country, as we rear beef and pork enough for the consumption of our country; and it is well known that there is not enough wool made in the United States to supply and keep in operation our woollen factories one half the year; and, as long as that is the case, we will be flooded with the foreign woollen goods, which is a constant drain of our gold and silver. (I would wish to say more on this subject, but it is running into political affairs.) In the cost of growing either coarse or fine wool per pound, I do not consider any difference; because the fine-woolled sheep that I now have produce more, (being from five to eight pounds per head,) are as easily raised, increase as fast, are equally hardy, their wool of readier sale, and that at a higher price, than the old coarse-woolled sheep. It is true that the coarse woolled sheep is the best sale to the butchers, because they have the largest carcass, and stand driving best. I shall close on the subject of sheep by saying, were it in the power of the authorities to put a stop to the slaughtering of sheep, it would be well for the people of these United States.

Hogs.—The most profitable hogs we can raise are those that are of full size at the youngest age; and, for this purpose, the best are the Leicestershire, Bedford, Berkshire, Chinese, and Calcutta; these all arrive at full growth at 18 and 20 months old, (provided they are well kept.) We know of no cheaper and more profitable method of keeping and fattening pork than to feed mush, as we call it, viz: have your corn ground, boil it to the thickness of mush, mix with it, when cool, all your spare milk and the swill of the kitchen. After clover is in head, let them run on it for pasture. Hogs raised and fattened in this manner will save to the owner at least 33 per cent. over the old method of letting hogs run at large through the summer, and in the fall putting them up in open pens and fattening them with corn in the ear. Yet most of the pork in this county is made after the old method. As to the amount 100 pounds will make, I have never as yet made the trial, but will say, through my own experience, that a saving of at least 33 per cent. will be made by cooking their feed as above recommended. As to the best method of putting up

pork and curing hams and bacon, I do not pretend to know any other method than the old plan of salting and smoking.

Fruit Culture.—The culture of fruit is receiving increased attention; the value of apples grown on an acre of ground is certainly of more value, either for table use or feeding, than any crop of grain cultivated in this county. As to the comparative value of apples and potatoes, I cannot say, but should think one and a half bushel of sweet apples is equal to at least one of potatoes for feeding stock, &c. The best keeping apples we cultivate are Romanite, golden pippin, green pippin, winter yellow pippin, Robinson apple, signify, seek-no-further, Esopus Spitzenberg, French or Newark pippin, and many others that I might enumerate—all very fine fruit, which thrive well in this county; but the fruit of all kinds failed this season. No apples are exported from this county, on account of its inland locality. We know of no remedy for the blight on pear trees and apple trees; but few of our fruit trees are affected by it in this county. Our peach trees are somewhat affected with the yellows, but no remedy is known with us. The best manner of transplanting fruit trees is, to stake off your ground so that the trees will be 33 feet apart, then dig a hole 20 inches deep and 4 feet in circumference, mix 4 bushels of fine, well-rotted manure with as much of the ground you threw out of the hole you made for the tree as will fill the hole and plant your trees in. Place a post beside the tree, and keep the tree tied to it at as many places as necessary; a small band of straw is best to tie with.

Potatoes.—But few sweet are cultivated here. The Irish potato is cultivated to some considerable extent, but principally for domestic use. The average yield per acre is 200 bushels; the cost of producing, per bushel, (at that yield,) is 13 cents; the most profitable varieties are the blue Mashonock and the Baltimore blue, for table or cooking; but, for stock-feeding, the merino or red Mashanock and pink-eye are the most profitable, on account of their great yield. The best system of planting, tillage, and manuring is as follows: On 1 acre, put 30 two horse wagon loads of well-rotted barn-yard manure; plough it under 8 inches deep in the month of October, before you want to plant; immediately after ploughing, harrow it well both ways; let it lay till about the 15th of May; stir it as deep as you broke it the fall before; harrow it till the ground and manure are well mixed and well pulverized; furrow it out about 3 feet 6 inches apart; drop the potatoes (those of a medium size I think the best) 2 feet apart, with two in a place; cover them so as to make the ground level; when they are 6 inches high, plough 2 furrows in a row; then, with a corn-hoe, draw a small quantity around each hill; let them stand for 10 or 12 days; then plough them out by 3 furrows between each row, and draw with your hoe plenty of ground around each hill; then let them stand till fit to dig, and put into the cellar. If they should become affected with black rot, dig them as soon as possible, and spread them on your out house or barn floor, so that they may become dry; let them lie till cold weather before you put them in your cellar. If the potato bug should infest your patch, in the cool of the morning take a handful of slacked wood-ashes and sprinkle it in the centre of the hill, and the depredators will scamper for parts unknown; but keep watch, for in a few weeks they, or a new set, will come again, when a like process is necessary to drive them off. I have saved my potatoes for two

years from rot by the above process, and likewise saved them from the ravages of the potato bug by the above means.

Manures.—The best plan of preserving manures: It would be out of place in me to give any particular method, as the only plan with me, and, as far as I know of, my neighbors, is to pile our straw in the barn-yard; let the cattle tear it down and lie on it; if we have stable manure, we throw it on the straw; in the spring we scatter corn plentifully over it, and let the hogs at it; they will soon root the straw up in search of the corn, and by the next fall it will be in good order to put on the field. I am aware that there is a better way of making our straw produce more manure; but the time has not come that we want it, as our land is yet fresh, and we are in the habit of keeping it in such order as to produce fair crops, by ploughing down heavy crops of red clover; yet I well know that our crops might be much increased by using manure plentifully. But, necessity being the mother of invention, I am of the opinion that the best manner of making and using manures will not be sought for till necessity compels us to try all manner of experiments. *Lime* is not used in this county as a fertilizer, on account of its scarcity and high price, as there is no lime-stone in the county; what is brought here is for the purpose of building; it is worth, when slacked, from 25 to 40 cents per bushel. *Plaster* is used to some extent on clover and Indian corn, and found to be of great benefit; it is sown on clover in the month of May, and we use it by rolling our seed-corn in it; by making as much stick to it as we can, it will cause the corn to vegetate and come up quick, with a black-green color, which it will retain if well tilled. *Guano* is not used here.

Cotton, Rice, and Hemp are not cultivated here.

Tobacco is but very little cultivated.

Roots.—*Turnips.*—There are a few raised. When sown on new land they produce well, and are a profitable crop to feed stock. *Carrots.*—None are cultivated here. *Beets* are cultivated in our gardens, but only for table use. The mangel-wurzel is somewhat cultivated, and is said to be the best kind of food for milch-cows; their yield is very great, but what per acre, I cannot say.

If you should find anything that may be a benefit to agriculture, or to the country generally, in the above answer to your Circular, you are at liberty to place it in your valuable Report.

JOHN YOUNG.

Hon. THOMAS EWBANK,
Commissioner of Patents.

BUCYRUS, CRAWFORD COUNTY, OHIO,
November 28, 1851.

SIR: Your Circular, of the 18th October last, was duly received. Want of leisure has prevented an earlier reply; and I sincerely regret that reliable data, from which to obtain the information you ask, is so difficult to obtain.

The annual Reports from your Office have become of such importance, and are so much sought after by all classes of citizens—particularly the

farming and mechanical portions—that it would appear of sufficient importance to induce the different State legislatures to make some provision for collecting all such information, and having returns made of the same to some one of the county officers in each county. This could be done in our State—with but little additional trouble or expense—by the different township assessors, and could be attended to at the time of making their yearly assessment; from which returns reports could be made to your Office, which would be of vast benefit to all classes.

Under present circumstances, much of the information furnished you must necessarily be very imperfect. I herewith annex replies to the different inquiries contained in your Circular, giving all the information in relation to the same which I have been able to obtain; and it is as correct as circumstances would allow, although I am aware it is, in many respects, very imperfect.

Very respectfully, your most obedient servant,

J. B. LARWILL.

Hon. THOS. EWBANK,
Commissioner of Patents.

To enable those who are not acquainted with the size of our county to form a proper estimate of its productions, as compared with those of other counties, it might be proper to state that it contains barely the constitutional limits of 400 square miles, which is smaller than most counties in the State; and that a part of the county was, but a few years since, purchased from the Wyandot Indians, and is, as yet, but thinly settled; and the whole county is new, as compared with the eastern portion of the State.

Articles listed for taxation in Crawford county, Ohio, for the year 1851, *as returned to the auditor's office.*

	Number.	Value.
Horses, all over 2 years old	5,252	$234,717
Cattle, all over 2 years old	14,069	136,276
Sheep, all over 6 months old	68,878	43,978
Hogs, all over 6 months old	18,386	25,014
Pleasure carriages	576	23,739
Pianos	4	400
Watches	502	5,699
Manufactured articles	—	26,277
Merchants' capital stock	—	81,929
Manufactures	—	26,737
Moneys and credits	—	206,202
Total value of taxable property, moneys, and credits, exclusive of lands		$810,968

The amount of wool exported from this county for 1851, from 250,000 to 300,000 pounds, at an average price of 37 cents per pound. As the wool passed through but few hands, the transactions in this article could be ascertained with tolerable certainty.

Principal Crops.—The principal crops are wheat, corn, oats, clover-seed, timothy-seed, and hay.

Wheat.—The usual average product of wheat per acre is from 15 to 20 bushels, although 30 bushels are often raised. Time of seeding, from 15th August to 15th September; some sow still later. The time of harvesting commences generally about the 1st to the 8th of July, and continues some 3 weeks. No particular preparation of seed known. Quantity sown per acre, from 1 to 2 bushels, generally 1½ bushel. What particular variety has proved most advantageous, not informed.

Corn.—Average product per acre, about 40 bushels. Cost of production: 12 cents per bushel is paid for raising. For that price it is raised, cut up, and delivered in the shock, not husked or shelled; the land and house-rent furnished, together with a small amount of pasturage—say for 2 or 3 cows and 2 horses. Not much manuring done for corn. The plough and hoe mainly used; some, however, use the cultivator. The general method of feeding is raw, and often fed in the field, without gathering; but it is believed that much saving would result from boiling or grinding, especially if ground with the cob, then fed to cattle and sheep. No knowledge of any experiment having been tried to ascertain what would be the product of any given quantity of manure of any kind.

The average yield of oats is said to be about 40 bushels per acre. Considerable quantities raised, both for home use and for exportation. Average price, 20 to 25 cents per bushel.

Barley.—Average yield of barley per acre, 40 bushels; but small quantity raised; price, 37 to 40 cents per bushel.

Rye.—Average product per acre, 25 bushels; price, 40 to 45 cents per bushel; none grown for exportation.

Peas and Beans.—No fields of peas or beans raised; some few beans raised with corn; usual price of beans, 75 cents per bushel.

Clover and Grasses.—Timothy usually produces about 1½ ton per acre. Large quantities of clover were formerly raised in this county. In one season, a few years since, over 20,000 bushels were exported. Since that time the seasons have not been favorable; the grasshoppers have destroyed much, and it has become more profitable to use the pastures for sheep than to cultivate clover for the seed. Timothy is generally preferred for meadows, when intended for hay or pasture. Some, however, prefer a slight mixture of clover. Quantity sown to acre usually about 1 peck of either, or both mixed; cost of growing hay, $1 50 to $2 per ton; average price, delivered, $4 50 to $5.

Butter and Cheese.—No particular or systematic method of making butter, although large quantities are annually made, both for home consumption and for exportation. The amount exported annually will not fall short of 200,000 pounds, and may be much more; average price, 8 to 10 cents. Very little attention paid to the manufacture of cheese; much that is consumed here is brought from the Western Reserve. No means of knowing the relative cost of making butter and cheese, nor the product of either per cow, or from a given quantity of milk.

Neat Cattle.—Cost of raising until 3 years old, about $13 to $15; usual price per head at that age, $18 to $20; value of good dairy cows in spring, $15; in fall, say $12. Cannot say how much beef 100 pounds of corn will yield, or which stock yields the most; but the Durham stock is generally preferred for beef. For breaking steers, no particular method.

Horses and Mules.—The growing of these is esteemed profitable at present prices. The expense till 3 years old for colts, $45; mules, $35

to $40. Best method of breaking, *by kindness*. Harsh treatment to the horse is productive of much evil: it injures the disposition, and makes him unsafe. So say our best horsemen.

Sheep and Wool.—Our farmers consider the growing of sheep and wool, at present prices, as profitable as any branch of their business, if not the most so; but they do not expect the last year's prices to continue. Cost of growing coarse wool, per pound, about 18 cents; for fine, about 25 cents. I can hear of no experiments having been tried to ascertain how much wool a given quantity of hay would produce.

I believe our farmers prefer to raise good-sized sheep, although the wool should not be as fine as best Saxony; they then have more wool, and the sheep are worth more for mutton. For that purpose, they cross the Saxony with the French merino, and other large sheep. The proportion of lambs annually raised to the number of ewes is, I am informed, about 75 to the 100 ewes.

Hogs.—A considerable number of hogs are annually raised and fattened in the county; but the most approved breeds have not been introduced. No experiments have been made to ascertain the comparative merits of the different breeds, the best modes of feeding, or the best methods of curing pork and bacon.

Hemp.—No hemp has as yet been grown in the county; but I have no doubt that our lands (especially the plains) are well adapted to the culture of hemp, and that it would pay much better than wheat.

Turnips, Carrots, Beets, &c., are not cultivated as *field crops*, at least so as to be used as feed for stock, to any great extent.

Potatoes.—The *rot* has so completely destroyed the potato for some years past, that few are now cultivated. No variety appears to be exempt from the disease; no remedy known which has proved of much service. Some think they have found benefit by the use of *lime*, applied so soon as the potatoes are taken from the ground. The lime dries the surface, and it also prevents the disease from communicating from unsound to sound ones.

Fruit Culture.—The culture of fruit, particularly of apples, has for many years past received considerable attention. Many of the best varieties known in the United States have been introduced; and most kinds grow well, and are of equal flavor with those of any part of the State. The crop is usually good; but within a few years it has been much injured by an insect, which stings the apple when young, and deposits its egg, which produces a worm, that eats and destroys the core of the apple, and causes decay. No remedy has been discovered to prevent its ravages. Should this evil subside, and our projected railroads be completed, affording cheap transportation to the East and South, the apple crop will be quite productive.

The peach crop is quite uncertain; the blossom buds generally get winter bitten; yet when they escape, the crop is sometimes large, and the quality good.

Grapes.—The few experiments which have been tried with the grape go to prove that it could be cultivated to advantage in many parts of our county whenever it shall receive proper attention.

Manuring.—No experiments have been instituted to test the relative value of the different manures—no lime or plaster, and, so far as I can ascertain, certainly *no guano*. We have in this county several beds of *shell-marl* as good as to be found anywhere; but it has not been tried as a manure.

BUCYRUS, OHIO, *January* 5, 1852.

SIR: I have succeeded in raising a crop of corn the past season, the debit and credit of which stand thus:

Dr.		Cr.	
To 10 days ploughing...	$10 00	By 700 bushels corn....	$218 75
5 days harrowing...	5 00	Fodder.....	75 00
2½ days marking out	1 87½	14 two-horse loads pumpkins.....	10 50
8 days planting.....	4 00		
2½ bushels seed.....	62		
Going through with cultivator.....	3 00		
Going through with shovel-plough....	3 00		
Cutting and shocking	5 00		
Interest on value of land.....	18 00		
Taxes.....	1 20		
Whole cost.....	$51 69½	Amount.....	$304 25

I find, by careful comparison, that the fodder on each acre is worth more than 1½ ton of my best hay for feeding sheep or cattle, the market value being $5 per ton for hay. These figures make the fodder exceed in value the whole cost of production $24 31, which will pay for boarding and husking—items not included above—amply, leaving all the corn and pumpkins as net profit.

The 10 acres on which this was raised have been in cultivation 12 years; it is rather a low price of ground, and has paid as great an annual profit, I think, as any in this vicinity. I see as much of the elements of crops in it at present as when first cultivated—a matter of vast consequence to the farmer. The above result is nothing more than every man, by ordinary good farming, can obtain if he will abstain from making an annual dividend at the expense of his capital. I know of no other source from which Hudson (the so-called Railway King) could have borrowed his system of management, unless our American farmers suggested the idea.

I have computed the labor and the crops at their market value, and am not able to see any error in my calculations. My plan will be to feed all the produce of this field, and return the manure so made back; give a thorough ploughing and harrowing, plant and cultivate as before, and seed with clover; then go through with the cultivator the last time; by which means as good or a better crop of corn will be obtained, and the field not exhausted. I have omitted to state that the field had been used as a pasture the season previous to planting with corn. I have been cultivating the Osage orange, as a substitute for rail fence, for three years; have sown a quart of seed each spring. The first quart was carefully sown, after soaking a number of days in warm water, from which I obtained nearly 1,200 plants, one-third not germinating until the second spring. The second quart, treated similarly, did not produce 100 plants. On the 30th of last April I sowed the third quart of seed, which had been soaked in warm water 5 days, to which I added as much saleratus

as I could take up with my thumb and finger, repeating the dose as often as necessary. As soon as sown, the rows of seed were covered with boards, which were not taken off until some of the plants had made their way up to them. I think every seed must have vegetated, as it produced about 8,000 plants. I think 1½ inch the right depth to cover the seed, and that it is essential to have the soil deep, mellow, rich, and moist. My plan of planting the hedge has been to throw up land, ten feet wide, with the plough, going as deep as possible; harrow until well pulverized; strike a furrow on the centre, straight as a line; stretch a line over the centre of the furrow, put in the plants, 14 inches apart, carefully pressing the soil around them, and placing them exactly where wanted. I cultivate a row of potatoes, or some other vegetable which will not shade them, on each side the first and second seasons. As to their capacity to stand transplanting, I will state that, in 28 rods of two year-old plants, put out last spring, not a single failure occurred. They were cut off at the surface of the ground when planted. They now stand nearly 5 feet in height. It is my impression that any clipping the first summer retards their growth. Taking all things in view, two-year-old plants are the best for setting. They require less attention, and make a fence quicker. The expense of preparing ground and planting will not exceed 10 cents per rod. There is a large portion of northwestern Ohio that is level, and abounding in low grounds that are more or less overflowed with water every season, which prevents their otherwise profitable culture. The soil being of the most fertile description, makes the draining of them very desirable, aside from the influence they exert upon the health and appearance of the country. They scarcely need a drain exceeding 18 inches or two feet in depth. Digging them with the shovel being a laborious, costly, and otherwise objectionable method, induced me to try ox-power for the purpose. I first ploughed, where I wished the drain, to the right width, and as deep as I could; then took a scraper and hauled the dirt into the low places adjoining them by improving the surface; if not deep enough, ploughed again, or until of the required depth.

The Report from your Office is annually diffusing much valuable information through our land. It is to be regretted that so many of them find their way to those who make politics, instead of farming, their business.

Yours, truly,

BENJAMIN SEARS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

MOUNT GILEAD, MARION COUNTY, OHIO,
December 2, 1851.

SIR: Your Circular, making inquiries in relation to the agricultural products of the county, came to hand by the politeness of Mr. Chase; and I embrace the earliest opportunity possible to reply to your interrogatories.

Wheat.—Guano has never been used in this county; our soil is mostly a clay soil, with some muck bottom lands. Wheat is sown from the 1st to the 15th of September. An average yield is about 25 bushels to the acre. We sow about 1½ bushel to the acre. But little summer fallowing is done here; we have subsoiled some, with excellent results.

Farmers are adopting the plan of ploughing from 8 to 10 inches deep. The average price of wheat at our market during 1851 has been about 55 cents for white wheat. I am satisfied that the best system of rotation on our soil is to turn sod and subsoil for corn; sow oats the next spring; and after seeding with oats, seed with wheat; then with clover.

Corn.—Our average crop of corn is about 50 bushels to the acre; average price, 28 cents per bushel. The average quantity of hay, per acre, is 2 tons; seeds preferred are clover and timothy, mixed. Average price of cheese, per pound, 6 cents; butter, 10 cents. Value of good dairy cows in the fall, $14; in the spring, $18. I think the best plan of breaking steers is to take them at the age of one year, when easy to handle; or to yoke them with oxen already broken.

Wool-growing is considered profitable. Considerable excitement has existed in the wool-market, and consequently among wool-growers here, during the past season. Ordinary flocks sold readily last spring, after shearing, at $1 each. Thus 100 head would cost..... $100 00
Interest on $100..... 6 00
Cost of keeping 100 head of ordinary sheep one year..... 75 00

Total..... 181 00

But to make it safe, we will estimate the cost at $200. Estimating the profits on the wool taken from 100 sheep of ordinary quality, and allowing 3 pounds per head, we have—
300 pounds of wool, at 35 cents per pound..... $105 00
45 lambs, above loss of flock..... 45 00
100 sheep on hand..... 100 00

Total..... 250 00
Deducting cost of flock and keeping..... 200 00

Clear profit on 100 sheep, or 50 per cent. profit..... 50 00

This is a low calculation, and provides for graining the sheep during the winter.

We will next take a flock of fine Pennsylvania merino sheep:
100 head, at $2 50 per head..... $250 00
Interest on $250..... 15 00
Keeping (in keeping, we find sheep with grain)..... 100 00

Total expense..... 365 00

Wool on 100 head of fine merino sheep, allowing 3 pounds per head, 300 pounds; which, at 50 cents per pound..... $50 00
45 lambs, above loss of flock, at $2 50 per head..... 112 50
Worth of original flock..... 250 00

Total..... 512 50
Deducting expenses..... 365 00

Clear profit on 100 sheep..... 147 50
or 59 per cent. in favor of fine wool.

For mutton the ordinary sheep will excel. These fine-wool sheep can only be sold at those prices for stock-sheep, and raising wool. Again, take 100 head of fine three-quarter blood French or Spanish merino,

Vermont stock, at $10 each	$1,000 00
Interest on $1,000, at 6 per cent	60 00
Cost of keeping	100 00
Total expense	1,160 00
Weight of wool on 100 such sheep, at 6 pounds per head, 600 pounds; 600 pounds, at 50 cents per pound	$300 00
45 lambs, above loss of flock, at $10 each	450 00
Original stock	1,000 00
Total	1,750 00
Deducting expenses	1,160 00
Clear profit	590 00

or 59 per cent. on $1,000.

The last mentioned, being large bodied, are considered best for mutton.

We offer another calculation on 100 native sheep, at 75 cents per head:

Cost	$75 00
Interest on $75	4 50
Keeping 100 head native sheep, 75 cents each	75 00
Total expense	154 50
Weight of wool on 100 native sheep, allowing 2½ pounds each, 250 pounds; 250 pounds, at 30 cents per pound	$75 00
45 lambs, above loss of flock, at 75 cents per head	33 75
Worth of original flock	75 00
Total	183 75
Deducting expenses	154 50
Clear profit	29 25

or 39 per cent. on $75.

This calculation is, I think, about correct. It will be noticed that it requires a much larger capital for high priced fine-woolled sheep than the same number of coarse; yet, with the latter, if the wool grower realizes the same amount of money, he must keep many more sheep, and consequently invest more in land, when he would not realize as much profit. Our most noted wool-growers are J. Mosher; Jonathan Wood; Stephen Brown, Mt. Gilead; McKibbor, Smith's Mills; Gilmore, Culmary, & Elliot, of Iberia.

I am, most respectfully, yours,

SAM'L N. WOOD.

Hon. THOS. EWBANK.

GALENA, DELAWARE COUNTY, OHIO,
December 29, 1851.

SIR: The best method of raising *wheat* in this portion of the State of Ohio is to break a clover sod in the fore part of August, and turn under a half growth of the clover; let it lie from 3 to 5 weeks, then harrow thoroughly lengthwise of the furrow, and sow 1½ bushel of seed to the acre, and harrow both ways; all done before the 20th of September. Harvest, from the 4th to 15th of July; average crop, 15 bushels; worth, this year, 50 cents. We have a surplus, and no foreign demand; therefore, a very low price. Soon after the wheat is harvested, the stubble should be ploughed under 6 to 8 inches deep, and lie till the following spring, when one light ploughing will fit the ground for oats or corn.

Land thus prepared, and well tended, will average 50 bushels of *corn* to the acre; and, where it is designed for fattening steers, it is cut and shocked in the fore part of September, and drawn thence to the pasture lots altogether, and fed to cattle once per day during winter, which suffices for fodder and grain, and proves to be a profitable way of feeding corn to cattle.

This land is next ploughed in the spring for *oats*. It is desirable to sow in March, if the land is dry. One ploughing is sufficient. Sow 2 bushels of seed to the acre, and harrow; then sow 4 quarts clover and 4 quarts timothy seed, and harrow once more. This fits the land for pasture or mowing, in which state it is to remain 2 or 3 years before ploughing again. Land thus farmed, if well ploughed and thoroughly tilled, will improve for a succession of years.

Oats will produce from 40 to 50 bushels to the acre; worth 16 to 20 cents; and are considered a very exhausting crop.

We have here an article of winter *barley*, which should be sown and treated similar to winter wheat, and will be fit to harvest 10 days sooner; produces 40 to 50 bushels to the acre; weighs heavy, and sells readily at 1 cent per pound. It is considered a very profitable crop.

Beans will produce 10 to 12 bushels to the acre; are only raised for home consumption; worth $1 per bushel.

Clover and Timothy are our best grasses, and produce most hay or pasture when sown together; quantity of hay, about 1½ ton per acre Clover, as a green crop, is far the best fertilizer, and should be sown early in the spring, 8 quarts per acre; should not be pastured first year It will then produce a large amount of pasture for 1 or 2 years, and is fit to turn under for wheat.

Dairying is rather a new business for profit here; still, it is apparent that it is a money-making business.

Neat Cattle.—The price of cows varies between fall and spring from $15 to $20 for common stock cows. Durhams or improved breeds here are worth from $35 to $60, and will take on 25 per cent. more flesh, all other things being equal, than other cattle; are more peaceable and more profitable. The best oxen are made by breaking when quite young. Most farmers have boys who can yoke the steers before they are 1 year old. They are then easy to handle, and will do a little work at odd times, and become perfectly handy by the time they are three years old; and then, if well kept two years, will make a fine team.

Raising *horses and mules* is profitable. Colts can be raised until they are 5 years old for $10 per year, and will then be worth $75 to $100.

Mares that raise colts should graze in pastures summer and winter, with stacks of hay to eat from in winter. Colts would be benefited by having a little extra care the first winter of their lives; after that, the same range with the mares till five years old.

Wool-growing is a profitable business in this portion of Ohio. Sheep are healthy. A grade of wool between coarse and fine is most profitable. It will weigh more to the sheep, or fleece, than most others, and sell at a nearer price to the fine than its reality would seem to indicate; then the sheep are heavier and better for mutton than even the coarse kind. The average weight of fleece 3 pounds, and sold this year at 35 to 40 cents per pound. The proportion of lambs raised, about 75 from 100 ewes.

Hemp-growing has been a profitable business, but is less raised on account of scarcity of hands to break and fit it for market. It produces about 600 pounds to the acre, and can be raised for $13 per acre.

Irish Potatoes are grown only for the table. They produce poorly—in many cases not over 100 bushels to the acre—and sell at 25 cents per bushel, unless scarce; therefore it is much more profitable to raise corn than potatoes. We frequently get as many bushels of corn per acre. It can be raised with the same tending, and not half the labor of planting and harvesting.

The Culture of Orchards has met with much attention for a few years past. Good fruit is not only valuable at home, but commands a good price and ready sale in all the towns and villages. I have no doubt a better profit can be realized from land set in choice orchards, even to feed stock, than from any kind of root crops. We have many kinds of good keeping apples; among them, of good keepers, are the Rhode Island greening, Roxbury russet, golden russet, Spitzenberg; and, finally, some of the Rambo keep well, and are excellent at all times.

Grasses.—I am told that, in Seneca county, Ohio, they have found a timothy sod better for wheat than clover, on account of wintering better. If so, it is worthy of particular consideration, for winter-killing is of great damage to our wheat; and not only that, a timothy crop is far more valuable than clover, the hay always selling for 25 per cent. more than any other. I wish it were definitely understood that no grass is so valuable for hay as timothy, or herdsgrass.

Respectfully, yours,

NATHAN DUSTIN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

MILFORD CENTRE, UNION COUNTY, OHIO,
December 25, 1851.

SIR: Your Circular was duly received, and I will proceed to answer your inquiries as well as my limited knowledge will permit.

Wheat.—Union county grows comparatively little—not much more than her home consumption. Our soil is adapted to grazing. Principal products, corn, beef, pork, butter, cheese, hay, and wool. There is no guano used in the county.

Corn.—Average yield per acre, 40 bushels. Cost of production, about 10 cents per bushel. Best mode of culture: plough 8 to 10 inches deep, plant in rows 3½ feet each way, or 4 feet one way, and drill 10 to 12 inches; stir the ground often (say twice a week) with plough and cultivator. Best method of feeding where corn is cheap, as it is here, (from 15 to 20 cents per bushel,) is that which requires the least labor; it will not do to grind or cook.

Clover and Grasses.—Quantity of hay per acre, 1½ ton; grass seeds preferred in laying down are clover and timothy. There should be 8 pounds of each used to the acre. Red-top used on moist land. Cost of hay in the stack, $2. Value of hay per ton, from $3 to $4; difference owing to its being near or remote from a village.

Dairy Husbandry.—Average yearly produce of butter and cheese, 300 pounds per cow. There have been instances of obtaining 500. Comparative cost, about 3 pounds of cheese, equal to 2 of butter.

Those who follow cheese-making here make very little butter until after the middle of October. They set their milk in pans or crocks, let it stand from 24 to 36 hours, then skim and let the cream stand as much longer, then churn in Crowell's patent thermometer churn. Common sack salt is used; buttermilk all worked out, then put down. No other substance is used. Average price of butter, 12½ cents per pound. Cheese, 5 cents at the place where manufactured.

Neat Cattle.—Cost of raising till 3 years old, from $12 to $18—average age, say $15. Value at that age, from $15 to $30, according to size and quality—average, say $22. Value of good dairy cows in the fall, about $12 50; in spring, $20. I will merely observe, that our best farmers consider it necessary that their stock of all kinds should be furnished with a full supply of straw, &c., in their yards, stalls, or pens; and that the manure, when made, should be protected, as much as possible, from the heat of the sun and drenching rains.

Breaking Steers to the Yoke.—My plan is (and I have broken a good many) to break them the winter before they are two years old. First get them into the yard; then into a small pen, so strong that they cannot break out; then feed them corn-nubbing, and handle them gently. Get them yoked, if possible, before they are aware of it; then feed them more corn. Now hitch them behind a steady yoke of cattle; drive them around awhile; then feed them more corn; now make them fast, and then unyoke them, and feed a little more corn. Repeat the whole operation the next day twice, morning and evening; do not forget the corn. The third day put them in the lead. Handle them a little every day, morning and evening; yoke and unyoke every time. Do not beat them. If you cannot make them do as you wish, and get vexed with them, do not abuse them, but feed them corn. You will soon be able to drive them alone. This should be done soon, as they never will be broken right without. Now, if you have a small stock and a light sled, they will haul enough to feed them; and this will be enough for them to do morning and evening, and they will very soon be quite handy. But mind, you must give them corn every time you yoke, and enough, until they become quiet, so that you can handle them and get up to them in any place, and they never will forget it, but continue quiet and gentle all their lives.

Wool-growing is a good business. There is comparatively little differ-

ence in growing coarse or fine wool here. Cost per pound, 20 cents. Merino is more profitable than Saxony, however. The difference in price does not compensate for the difference in weight. We have to depend principally on the fleece here at our distance from market. A company have imported here from France, the past season, a lot of the Rambouillet sheep. Their average weight of fleece (in the dirt) was 13 pounds; live weight of heaviest ewe, 187 pounds; live weight of heaviest buck, 220 pounds. Sold the wool at 30 cents per pound. Wool has ranged (that is, the last clip) from 33 to 48 cents per pound, washed. Proportion of lambs to ewes in small flock, one to the ewe; large flocks, unless there is extraordinary care taken, one-fourth less.

A large proportion of Union county is yet comparatively new and unsettled. Some excellent stock are in the south part of it.

Respectfully, yours,

ELIPHAZ BURNHAM.

Hon. THOMAS EWBANK,
Commissioner of Patents.

TARLTON, PICKAWAY COUNTY, OHIO,
December, 1851.

SIR: I received your Circular of August, 1850, through the politeness of the Hon. Edson B. Olds, representative in Congress from this district, on the 26th of October last. The time being short, and I not aware of being called upon to answer any such questions, and the lack of education, and my imperfect knowledge of agricultural chemistry, I fear will render me incapable of replying in a satisfactory manner; yet the interest I have always taken in agricultural pursuits prompts me to say something. It will be a plain, simple statement of facts, of which you can make such disposition as you think proper.

There are four things that all farmers should strictly attend to: 1st, good fences; 2d, good cultivation in good time; 3d, save all manure and everything that will fertilize the soil, and apply it in time; 4th, good care of, and economy with all things.

Manure is one of the most particular things that all farmers should pay strict attention to, and see that it is all saved and well applied. I know nothing of agricultural chemistry only what nature and experience have taught me; and do not credit the statements of learned chemists, such as Liebig, and a host of others, who contend that vegetation receives the greatest part of its nourishment by and through the atmosphere—a thing reason and nature will not admit of. If such statements be true, I have toiled and labored with manure 50 years in vain; that is, if 98 loads of manure out of 100 are in vain.* In my opinion there is but one way that manure can be kept till it is decomposed without losing some of its virtue, and that is in a manure-cellar. (See Patent Office Report

[* No chemist teaches the doctrine that "98 loads of manure out of 100 are in vain" or worthless. Our correspondent is fighting a windmill of his own setting up. His theoretical views are of no value; but his suggestions in farm economy are worthy of attention.]

of 1848, page 363.) The next to manure is lime; as for plaster or guano, it is not used in this section of country. The quantity of lime to be applied is immaterial; there is little danger of applying too much if mixed with the soil. In a freestone soil, lime is equal to manure, if not preferable. In this section of country, our lime is all burnt of pebble stone, taken out of the Scioto river and smaller streams; there is no rock limestone in the Scioto valley south of Columbus, while north it is in abundance. Lime out of pebble stone is better for land than that which is burnt out of rock stone. In the year 1839 I put up a brick building; I hauled out all the rubbish and riddlings of lime, which was about four loads, on to a quarter of an acre, which has ever since produced a fourth more than any other part of the field of all kinds of grain. I formerly thought no soil could be fertilized by its own productions; but long experience has taught me otherwise. I commenced improving in the woods in 1808, and have lived on my farm since 1812; it was a thin, white-oak soil—the most of it. When I first commenced, I had to burn considerable logs, brush, &c.; but, by trying experiments, I have ascertained that the brush, litter, and leaves, taken from one acre of new land when first cleared, and spread on an acre of old worn-out land, and let lay a year or two, will make it equal to new land, if not better. There is not an acre of my cleared land that is not better now than when first cleared; but it has cost me labor, attention, and care. I burn nothing on the farm except wood in the house, &c. I do not agree with some learned chemists, who say burn your straw and carry out the ashes, and your land receives all the nutriment it drew out. I have a neighbor that tried that to his sorrow. I burn nothing. Stubbles, weeds, briars, and even stumps—draw them out on a poor spot.

In this section of country *wheat* and *corn* are the principal crops, though other kinds of grain are raised to a considerable extent. The corn this year is considerably better than last—I am not able to say to what per cent. I expect it will be made known by abler hands than myself. One thing I will state: A. R. Foreman & Co., in Wayne township, measured one acre of a field of 300 acres, which yielded 150 bushels. In this section of country we cut up all our corn and shock it in 12, and some in 16 hills. Square 16 is rather large; if the season is wet it is apt to mould; it is then generally husked out (when dry) in the field; the fodder reshocked for feed through the winter. I have taken a different plan: I built a shed by planting forks of white oak, which were about a foot in diameter, which have been in the ground 21 years. As soon as my corn is dry, I haul it into my yard, husk it, and put my fodder in the shed. In this way I lose nothing, and have my fodder dry all winter for feeding, and feed on the same yard all winter; and against the middle of August it is ready for hauling out, and is the best manure that can be applied on wheat land. I have often been surprised to see most of our farmers feeding their fodder outside of the fences and in the roads, and losing all their substance. Those that feed fat cattle feed corn and all together in feed lots. I know a number of feed lots that have been fed on several years that are apparently as rich as land can be made.

As to your last question—*time and degree of highest and lowest range of thermometer*—I have kept a journal for the last two years, and I know no other way than to copy the last year, though I expect it will be of no service, as I only took the degrees of the thermometer each day at sun

rise; therefore, I cannot give the range. The thermometer is placed in a fair exposure to the northeast, and out of the rays of the sun. We have a changeable climate, as will be seen by my journal. I have frequently known it to change from 10 to 20 degrees in 6 hours. It appears that we are situated between two climates: south—say, for instance, in the neighborhood of Chillicothe, which is 20 miles—the harvest is generally from 6 to 10 days earlier than here. I have seen it frequently. Their apple blossoms were all shed off when ours were in full bloom; and north from us—say 40 miles—it is about that much later.

Abstract of my Journal for the year ending December 1, 1851, *in Salt Creek township, Pickaway county, Ohio.*

Date.	Thermometer.	The weather.
1850.	*Degrees.*	
Dec. 1	42	Cloudy.
2	52	Rain.
3	36	Cloudy.
4	38	Rain.
5	39	Rain.
6	32	Snow.
7	36	Sleet.
8	20	Snow.
9	26	Cloudy.
10	28	Cloudy.
11	32	Cloudy.
12	44	Cloudy.
13	26	Cloudy.
14	21	Cloudy.
15	36	Rain.
16	26	Rain.
17	28	Cloudy.
18	32	Clear.
19	44	Rain.
20	26	Cloudy.
21	21	Clear.
22	37	Rain.
23	30	Snow.
24	13	Storm.
25	21	Snow 6 inches deep.
26	27	
27	24	Cloudy.
28	30	Rain.
29	29	Snow.
30	18	Clear.
31	20	Cloudy.
1851.		
Jan. 1	20	Clear.
2	23	Clear.
3	28	Cloudy.
4	31	Cloudy.
5	29	Cloudy.
6	40	Cloudy.
7	36	Cloudy.
8	34	Cloudy.
9	54	Thunder.
10	38	Cloudy.
11	32	Cloudy.
12	38	Cloudy.
13	35	Cloudy.
14	34	Clear.
15	48	Cloudy.
16	36	Thunder.
17	29	Clear.
18	6	Smoky.
19	14	Clear.
20	38	Smoky.
21	17	Clear.
22	46	Smoky.
23	35	Clear.
24	36	Clear.
25	38	Clear.
26	45	Clear.
27	40	Clear.
28	42	Cloudy.
29	14	Cloudy.
30	3	Clear.
31	0	Clear.
Feb. 1	16	Cloudy.
2	33	Snow.
3	34	Smoky.
4	34	Cloudy.
5	34	Clear.
6	33	Clear.
7	34	Cloudy.
8	56	Rain.
9	60	Clear.
10	24	Snow.
11	35	Cloudy.
12	24	Clear.
13	35	Clear.
14	49	Rain.
15	50	Snow.
16	22	Cloudy.
17	20	Clear.
18	32	Clear.
19	34	Clear.
20	50	Rain.
21	55	Rain.
22	42	Cloudy.
23	44	Rain.
24	66	Thunder.
25	36	Clear.
26	46	Cloudy.
27	62	Smoky.
28	37	Snow.

ABSTRACT—Continued.

Date.	Thermometer.	The weather.
1851.	*Degrees.*	
Mar. 1	26	Clear.
2	32	Clear.
3	23	Clear.
4	43	Cloudy.
5	46	Clear.
6	37	Snow.
7	31	Cloudy.
8	32	Snow.
9	28	Clear.
10	32	Cloudy.
11	40	Cloudy.
12	38	Clear.
13	38	Clear.
14	39	Clear.
15	50	Rain.
16	54	Fog.
17	44	Rain.
18	38	Rain.
19	32	Cloudy.
20	40	Clear.
21	32	Clear.
22	40	Rain.
23	42	Snow.
24	46	Clear.
25	42	Clear.
26	62, 72 at noon.	Clear.
27	64	Clear.
28	46	Rain.
29	46	Cloudy.
30	63	Cloudy.
31	64	Cloudy.
April 1	48	Rain.
2	64	Cloudy.
3	44	Clear.
4	48	Clear.
5	64	Rain.
6	44	Frost.
7	42	Frost.
8	58	Rain.
9	40	Cloudy.
10	58	Frost.
11	48	Clear.
12	32	Frost.
13	44	Rain.
14	43	Rain.
15	36	Snow.
16	36	Cloudy.
17	45	Cloudy.
18	30	Clear.
19	56	Rain.
20	43	Frost.
21	44	Heavy frost.
22	36	Cloudy.
23	36	Clear.
24	45	Clear.
25	52	Light snow.
26	50	Clear.
27	56	Clear.
28	45	Clear.
29	49	Rain.
30	46	Frost.

Date.	Thermometer.	The weather.
1851.	*Degrees.*	
May 1	44	Heavy frost.
2	29	Fruit killed.
3	37	Fruit killed.
4	50	Rain.
5	36	Frost.
6	40	Frost.
7	43	Frost.
8	56	Clear.
9	62	Clear.
10	61	Rain.
11	60	Clear.
12	72	Clear.
13	76, 88 at noon.	Clear.
14	71	Clear.
15	56	Clear.
16	64	Clear.
17	65	Rain.
18	66	Rain.
19	64	Clear.
20	70	Rain.
21	64	Clear.
22	70	Cloudy.
23	74	Cloudy.
24	44	Frost.
25	56	Clear.
26	46	Clear.
27	76	Clear.
28	74, 92 at noon.	Clear.
29	72	Rain.
30	68	Rain.
31	54	Cloudy.
June 1	70	Clear.
2	68	Clear.
3	42	Clear.
4	68	Rain.
5	64	Clear.
6	68	Rain.
7	76	Clear.
8	67	Clear.
9	58	Clear.
10	53	Clear.
11	64	Clear.
12	68	Clear.
13	65	Clear.
14	55	Clear.
15	57	Clear.
16	64	Clear.
17	62	Clear.
18	62	Clear.
19	58	Clear.
20	68	Clear.
21	70	Clear.
22	70	Rain.
23	68	Clear.
24	54	Clear.
25	60	Clear.
26	70	Rain.
27	72	Rain.
28	70	Fog.
29	76	Clear.
30	75	Rain.

ABSTRACT—Continued.

Date.	Thermometer.	The weather.
1851.	*Degrees.*	
July 1	62	Clear.
2	59	Clear.
3	66	Clear.
4	54	Clear.
5	62	Clear.
6	68	Clear.
7	74	Rain.
8	70	Rain.
9	74, 91 at noon.	
10	77	Rain.
11	70	Clear.
12	69	Clear.
13	76	Clear.
14	68	Clear.
15	68, 88 at noon.	Clear.
16	76, 90 at noon.	Clear.
17	74, 93 at noon.	Clear.
18	71	Fog.
19	70	Rain.
20	60	Clear.
21	64	Clear.
22	67	Clear.
23	72	Clear.
24	74	Rain.
25	72	Clear.
26	76, 91 at noon.	Clear.
27	80, 92 at noon.	Clear.
28	78	Cloudy.
29	68	Rain.
30	68	Rain.
31	74	Clear.
Aug. 1	64	Clear.
2	62	Cloudy.
3	67	Rain.
4	70	Cloudy.
5	67	Heavy rain.
6	68	Clear.
7	76	Clear.
8	74	Large rain.
9	66	Clear.
10	76	Rain.
11	72	Rain.
12	70	Fog.
13	63	Fog.
14	66	Clear.
15	76	Clear.
16	76	Clear.
17	67	Rain.
18	68	Rain.
19	66	Clear.
20	68	Clear.
21	72	Clear.
22	68	Rain.
23	65	Clear.
24	61	Clear.
25	70	Clear.
26	59	Clear.
27	52	Clear.
28	68	Clear.
29	64	Clear.
30	60	Clear.
31	70	Clear.

Date.	Thermometer.	The weather.
1851.	*Degrees.*	
Sept. 1	74	Clear.
2	74, 92 at noon.	Clear.
3	60	Heavy rain.
4	68	Clear.
5	68	Clear.
6	70	Clear.
7	72	Clear.
8	73	Clear.
9	94	Clear.
10	74, 93 at noon.	Clear.
11	76, 94 at noon.	Clear.
12	79, 95 at noon.	Clear.
13	76, 94 at noon.	Clear.
14	68	Cloudy.
15	54	Clear.
16	56	Clear.
17	57	Clear.
18	57	Cloudy.
19	64	Cloudy.
20	62	Cloudy.
21	64	Clear.
22	68	Cloudy.
23	72	Rain.
24	58	Light frost.
25	47	Light frost.
26	55	Cloudy.
27	52	Rain.
28	46	Rain.
29	48	Rain.
30	48	Clear.
Oct. 1	48	Clear.
2	52	Clear.
3	59	Clear.
4	54	Clear.
5	48	Clear.
6	48	Clear.
7	48	Clear.
8	52	Clear.
9	60	Clear.
10	60	Clear.
11	62	Clear.
12	65	Cloudy.
13	56	Rain.
14	47	Clear.
15	44	Clear.
16	42	Clear.
17	41	Clear.
18	52	Rain.
19	56	Rain.
20	48	Clear.
21	48	Rain.
22	44	Clear.
23	36	Clear.
24	36	Clear.
25	54	Rain.
26	38	Snow.
27	26	Cloudy.
28	41	Cloudy.
29	55	Cloudy.
30	60	Rain.
31	56	Fog.

ABSTRACT—Continued.

Date.	Thermometer.	The weather.	Date.	Thermometer.	The weather.
1851.	*Degrees.*		1851.	*Degrees.*	
Nov. 1.....	56	Clear.	Nov. 16.....	40	Clear.
2.....	52	Rain.	17.....	39	Clear.
3.....	42	Cloudy.	18.....	34	Clear.
4.....	36	Clear.	19.....	33	Clear.
5.....	34	Snow.	20.....	40	Rain.
6.....	35	Snow.	21.....	38	Clear.
7.....	28	Clear.	22.....	32	Clear.
8.....	38	Cloudy.	23.....	34	Clear.
9.....	38	Snow.	24.....	35	Clear.
10.....	38	Snow.	25.....	30	Snow.
11.....	34	Cloudy.	26.....	29	Clear.
12.....	40	Rain.	27.....	34	Clear.
13.....	56	Rain.	28.....	42	Cloudy.
14.....	58	Rain.	29.....	28	Clear.
15.....	50	Cloudy.	30.....	37	Cloudy.

The coldest days were in January—on the 18th, at sunrise, the mercury was 6° above zero; on the 30th, 3° above; and on the 31st, precisely at 0. The warmest days were in September—the mercury was, on the 10th, 93°; 11th, 94°; 12th, 95°; 13th, 94°. The season was very dry in June, July, August, September, and October.

Very respectfully, your most obedient servant,

WILLIAM JULIEN, SEN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

GALLIPOLIS, GALLIA COUNTY, OHIO,
November, 1851.

SIR: Through our mutual friend, the Hon. D. C. Goddard, I had the pleasure of receiving a package of Agricultural Circulars, which I promptly forwarded to such of the practical farmers of southern Ohio as I supposed would be enabled to give you full reports on the agriculture of that portion of the State. Should they comply with my earnest solicitations, we shall have the pleasure of seeing them in your next Patent Office Report. But, as a large portion are more practical than theoretical, in all probability they will decline the request, and southern Ohio will continue unreported. Therefore I have taken upon myself the task of saying something of the soil and agriculture of this portion of Ohio, in order to remove the impression set afloat by the State Board of Agriculture in their report to the Legislature—that this region of country was susceptible only of being used for sheep pastures. I trust I shall be able to show, most conclusively, that it is the very best portion of Ohio; and, taking into consideration the susceptibility of the whole country for agricultural improvement, and the inexhaustible partially-developed mineral wealth, it is not extravagant to say that no portion of Ohio, nor of any part of the United States, of equal extent, exceeds this in prospective

wealth; which we shall take the liberty to speak of in the sequel of these desultory observations.

From the junction of the Big Scioto to the mouth of the Muskingum, and extending back some 40 miles, the physical topography presents about the same aspect of hill and dale. The first, when examined as to fertilizing ingredients, is found to contain silica, calcareous, and argillaceous compounds, in all localities, in greater or less proportions of each, and by an improved system of farming—that is, returning a *quid pro quo*, and keeping the land in heart—can, and does often, turn out from 60 to 100 bushels of corn per acre, and from 20 to 30 of wheat. The valleys or low lands are compounded of deposits of vegetable decompositions, with less portions of calcareous ingredients, based on an argillaceous subsoil, with an adaptation to corn and Irish potatoes more particularly; and, when deprived of its vegetable exuberance, is well adapted to wheat culture. In a latitude of 39°, and in the valley of the Ohio, all products of the temperate zone grow well. Corn is planted in lands already exhausted, and in lands well kept up: the average crop is reckoned at about 35 bushels per acre the present season; which is about an average, in a series of five years, of ordinary seasons.

Wheat is cultivated with more system and care than corn, as it is one of the staple articles of agriculture. From results well ascertained, it is believed the average crop this season is about 15 bushels. The season was remarkably favorable. The spring was wet and cool, and wheat, even in poor lands, shot up and was hastened to maturity, and generally harvested in June, without the presence of fungus, or rust, or Hessian fly. The berry was full and plump, weighing about 62 pounds to the bushel; and never have the millers turned out a better article of flour than is about being shipped to southern markets.

When lands are kept in heart by a rotation of crops or fertilizers, bountiful crops are taken off; but when kept in corn until run down, and then sown in wheat, the crop is invariably small. Many are now going on with a regular rotation of clover and cereal crops, and occasionally bringing in a crop of corn; by which a full remuneration for labor is obtained. When it is supposed that wheat designed for seed contains the embryo of weevil or Hessian fly, previous to being sown it is soaked in alkali, which effectually destroys it. By many, blue grass is preferred as a fertilizer.

Oats succeed well here in an ordinary season; it averages about 40 bushels per acre. With wheat, it is also cultivated for exportation. Since the Mexican war has terminated, it does not command a price to remunerate the labor of cultivating; but our farmers are habituated to cultivating various crops, and continue it more particularly for home consumption; the surplusage is sold for foreign or southern markets.

Potatoes grow well, and on good lands, well adapted to potato culture, 200 bushels are taken from each acre. Those of early varieties, set early in March, and kept clean, need no other labor, and will mature by the 1st of August, and are harvested in September, and sent to market on the first tide in the Ohio. At the present time, on the margin of this county, (Gallia,) there are over 50,000 bushels of potatoes now on flatboats, attached to the Ohio shore, awaiting a tide to go off; they readily command, when dug, 30 cents per bushel.

Beans are an important branch of agriculture in this portion of Ohio. One of our most extensive merchants and produce-dealers is of opinion that some 6,000 bushels will go from this county (Gallia) the present season. While out obtaining that information, and on making inquiry what number of barrels of flour would be shipped from the steam-mills of this county during the present season, one of our largest operators informed me that it would reach some 20,000 or 30,000.

Grasses.—Hay is also an export article, and was most abundant during the past season. On good bottom-lands, the average yield is about one and a half ton per acre. Herdsgrass, or red-top, is the predominant grass; although timothy, on dry lands, succeeds well.

Dairy Husbandry.—No great attention is given to dairy operations; but, during the spring and summer, every family makes a surplus of butter, which is sold to merchants, rewashed, and the extraneous water extracted, and packed into kegs, and sent off to foreign markets.

Cattle.—But little attention is paid to the improvement of the breeds of cattle. The common stocks are of a kind that live on browse a great portion of the winter, and short pasture in summer, and are worth, at three years old, from $12 to $16. This is the stock that best suits common farmers not provided with sheds and plenty of provender, and will be fat, with half a chance every fall, with less food than is required to fatten the improved breeds; thus enabling ordinary farmers, on small farms, to supply their families with the luxury of fat beef almost spontaneously. At the same time, a better class of farmers, with extensive pastures of luxuriant grasses, and well supplied with winter food and shelter, are paying some attention to the improvement of their stock, having some fine crosses of Durham and the stock introduced by the Scioto Company some years since.

Horses are not raised, except for domestic purposes, and but few fine horses are to be found; good draft horses are more highly prized than those for the saddle.

Some attention is paid to raising *mules,* both for domestic purposes and other markets. They readilycommand, at 2 years old, from $40 to $60. They are in demand, and are considered profitable stock.

Sheep and Wool attract much attention, both for home consumption and foreign markets; but few have engaged in the sheep business as an exclusive branch of agriculture. Every farmer has his flock, and many have those of the best crosses of the merinos and South Downs, and other approved stocks; and all sell wool. Large quantities are annually purchased and shipped to eastern markets; it commands remunerating prices, and is considered a profitable branch of business to those who raise wool to sell.

Some extensive woollen factories are established among and near us, and are in active operation, manufacturing fabrics for home consumption and for the people in the valley of the Ohio, and thus relieving them of the burden of duties on imports, or onerous charges for land transportation from eastern manufactories; and enabling every one, in that respect, to be independent, and consequently happy.

Hogs are not produced in great abundance. The continual demand for corn, to supply the wants of the people at the iron furnaces in our vicinity, and the Kanawha saline, distant some sixty miles by the Kanawha river, makes the stock of corn too limited to spare much to hogs; con

sequently, pork cannot be raised here, converted into bacon, and go into market in competition with that produced in the more fertile regions of the Western country. Tobacco succeeds well; yet but few are engaged in it beyond a home demand.

Fruits of fine varieties are being raised in this country. Apples, peaches, pears, apricots, nectarines, cherries, &c., are produced to a limited extent; but, as yet, fruit culture is in its infancy, though the day is not far distant when the valley of the Ohio will vie with any portion of the United States in the production of good fruit.

When these desultory sketches are read, the reader may at once conclude that this is truly a region better adapted to sheep-farming than other agricultural operations; but we say to such that agriculture here is not the predominant and exclusive business of the country, like the other more favored agricultural districts of Ohio. We boast of our inexhaustible beds of iron-ore, stone-coal, lime-stone, Burr mill-stone,* earths for stone-ware, fire proof brick, with our forests abounding in timber suitable for ship-building, steam-boats, house-building, and a variety of other purposes; while we possess the enviable privilege of being in the vicinity of one of the noblest and most majestic rivers in the known world—"the beautiful Ohio."

Already is the mineral wealth of the country being developed; within the extent of forty miles are some twenty blast-furnaces in operation, turning out annually some 40,000 tons of pig-iron, worth $25 per ton—thus returning at least $1,000,000. To dig the ore, to haul it, to chop the wood to make the charcoal sufficient to make that quantity of iron, to quarry and haul the lime stone, to haul the iron to the Ohio river, and take it to market—require an expenditure of money and labor to an extent that is unknown to any but the owners. But the farmers in this region of country can bear witness to the immense quantity of beef, pork, vegetables, butter, eggs, and other agricultural products sold annually at the furnaces. The millers in the vicinity can also tell that it takes a "right smart chance" of flour to supply them. So, also, the merchants can tell what an immense quantity of shoes and boots, coffee, sugar, molasses, ready-made clothing, shovels and axes, it takes to supply them. And the two or three hundred wagons can tell how many tons of pig iron they have hauled to the river. Indeed, so lucrative is the iron business considered, that all concerned are promptly remunerated for their labor, and all are in favor of laying an import duty on foreign iron, and thus giving home manufactures an increased spur to more extended operations.

In the vicinity of the furnaces, agricultural products find a ready market, and often seemingly at exorbitant prices.

The coal business is a no less concern. The Pomeroy banks, some 16 miles above, are extensively engaged in digging and shipping coal to towns on the Ohio, and supplying steamboats. A steamboat of immense power is running in that trade, often taking down some 6 or 8 barges, averaging say 6,000 bushels; and often, on her return-trips, she propels against the stream from 8 to 13 empty barges.

[* We suspect that proper "burr mill-stone" is not found any where north or west of the Alleganny mountains. The rock exists in Georgia, and, doubtless, to some extent, in South Carolina and Alabama. In Georgia it is extensively wrought, and is equal, in every respect, to the best French burr—being precisely similar in its geolological position and lithological character.]

If it were possible to ascertain the number of bushels mined; the hands required in all the operations of loading, going to market, selling, and delivering; together with the hands engaged in every department, and families dependent on that enterprise for support; it would be swelled to an immense amount, and astonish those not acquainted with such operations. Here, again, is a home demand for an immense amount of agricultural products. So extensive are the coal operations of the Pomeroy banks, that a town has sprung up at that locality, numbering some 2,000 persons; where but a few years since was a forest and rocky desert—fit abode of the owl and beasts of the forest. From the upper banks in Pomeroy to the Middleport banks are some four miles, and presents a continuous village, although subdivided into four local towns, united on the river. Within that distance there are perhaps some two or three merchant flouring-mills; as many, or more, steam saw-mills; one or two founderies; a rolling-mill; and many other extensive establishments, required by the enterprise and industry of the people at that place.

In addition to the blast-iron furnaces and coal operations, there is springing up another operation that will require a large number of hands, and another demand for agricultural products—we mean the *salt furnaces* about going into operation at Pomeroy, where salt water equal to the best Kanawha water has been found, and can be manufactured into salt at as little cost as perhaps at any other establishment in the Western country; to which may be added the immense *lumber trade* going on from Racoon river, in Gallia county, to Cincinnati, employing, during the winter season, an immense number of hands, who have to be fed and clad also. A large number of hands are also employed in building barges, or, in Western parlance, flat-bottomed boats, to carry off the surplus products of agriculture. And now—taking some thirty-five miles on the Ohio, and embraced in Gallia county—there are some 40 barges, loaded with agricultural products, which will depart for other markets on the first tide in the Ohio, averaging some 80 tons each. And with such an association of varied interests, acting as handmaids to each other, it will at once be seen that this part of southern Ohio is to be the favored spot in Ohio, and, in point of industry and intelligence, will outstrip many of the older portions.

We set out to write on the subject of agriculture; but it was found necessary to notice the home demand for agricultural products, and to show that all the varied interests are going hand-in-hand in making the people of southern Ohio rank among the most intelligent and wealthy portion of the western country.

I am, sir, very respectfully,

LEWIS NEWSOM.

MUSKINGUM COUNTY, OHIO.

SIR: In answer to your Circular, I send the following:

Wheat has been more than an average crop this year. I think it will be near 20 bushels per acre. There is a decided improvement in farming throughout this county. Farmers are beginning to inquire into the best modes and most advantageous manner of farming, that they may get

the best yield, and, at the same time, not impoverish their land. Many are using the subsoil plough, and nowhere do they tell better than on our clay, wheat-land hills. First, they stir the ground deep, that in a heavy rain it may be prepared to retain the water, and thus prevent its washing the soil, or forming gullies. Wheat is generally sown on fallow, or after oats; but frequently two or three crops of wheat are taken in succession. This year, owing to the drought, corn ground has been sown more than usual. The average yield of our county is on the increase, as the farmers are being more convinced of the importance of ploughing deep. The prevailing kind is "*red chaff bearded;*" but the *white blue stem* is coming into favorable notice; it is thought to make the best yield, and commands from 3 to 5 cents better price; the average price this year is about 60 cents.

Seeding wheat is generally done between the 20th of September and 15th of October; but some farmers plough and seed until winter shuts in upon them, or rather shuts them out.

Harvesting is generally from the 1st to the 15th of July, and many farmers thresh from the shock with the machine; preferring that kind of machine that threshes and cleans at the same time.

Guano is not known among us yet as a farm fertilizer.

Corn this year is less than an average crop; was considerably affected by the "*wire-worm*" and *September drought.* Some few fields will not be worth taking care of for the grain; yet there will be an average of 35 to 40 bushels per acre in the county. The price varies from 25 to 30 cents per bushel, influenced by the facility to market. The principal crop is on the river and creek bottoms; and is frequently followed up year after year, for 20 or 30 years; and some bottoms have grown corn every year since the Indians left them, or the first settlement of the country.

Oats—This crop was above an average this year, and an unusual quantity was put in. The average yield may be said to vary from 35 to 40 bushels per acre, and price about 25 cents per bushel.

Barley and Rye are but seldom sown in this county.

Peas and Beans.—As a field crop, but seldom met with.

Hay has been a full crop; the average will not fall much short of two tons per acre; sells for from $6 to $10 per ton. Farmers are improving their meadows, and the quality of the hay is very much improved within a few years. Timothy prevails.

Dairy.—But a limited quantity of cheese is yet made in our county, although some farmers are turning their attention to it. Some as fine as any in the State was exhibited at our last county agricultural fair.

Butter is made in abundance for our own and foreign markets. Large quantities are annually shipped to the eastern cities, and some families of Philadelphia rely upon our county for their yearly supply; and when our great Central railroad is finished, it will be no small article of traffic. A better quality than is made by some of our farmers cannot be produced. Most of our best butter-makers are from Bucks county, Pennsylvania. The average price is from 10 to 20 cents per pound; varies with the season.

Cattle.—Some of our farmers deal considerably in neat cattle for droving and home consumption. Beef retails at from 4 to 6¼ cents in our market. The price of cows varies from $12 to $20. Durham, Devon,

and Hereford are being largely introduced, and the stock thereby much improved.

Horses are principally used in this county, although mules are coming into use very rapidly; they are believed to be much more profitable, either to raise or for use.

Sheep.—Many of our farmers have entered very extensively into wool-growing; are introducing the finer grades, and find it to be profitable. There have been purchased in our town the past season 450,000 pounds of wool at an average of 40 cents per pound.

Hogs are not extensively raised in this county, and pork-packing is done but on a limited scale. Some two or three persons do something at it for a few weeks each season.

Hemp is only cultivated to a very limited extent.

Root Crops.—Roots are not extensively cultivated as a field crop, although some farmers are trying the experiment with their own stock.

Potatoes.—Both Irish and sweet are extensively cultivated; and for the last few years the former have commanded a fair price, averaging from 30 to 50 cents per bushel. This year the crop of late potatoes has been seriously affected by the drought; consequently, the price is stated at 50 cents.

Fruit is well nigh a failure, both apples and peaches; a very few inferior ones are offered in our market at from 75 cents to $1 50 per bushel. In ordinary seasons we have an abundance of each; but few pears are yet cultivated.

Manure is not sufficiently appreciated as yet. Some of the better farmers husband it, and are beginning to use lime to a limited extent.

Yours, respectfully,

JAMES L. COX.

THOMAS EWBANK, Esq.,
Commissioner of Patents.

McCONNELSVILLE, OHIO,
December, 18, 1850.

SIR: Your Circular for 1849 was duly received, but not answered, because it called for information by States. That of the present year is before me, and I proceed to answer it, so far as my information extends, or the good of the public appears to me to require.

I shall, in most of the answers, confine myself to reliable information from books and persons, to my own observations and experience, and the results of comparisons of the published Reports from your Office, and those of the Ohio State Board of Agriculture. A few, however, must, of necessity, be the result of analogy.

This (Morgan) county lies in the valley of the Muskingum river, is very hilly, and, in parts of it, almost mountainous. A great portion of the lands are, however, arable. The soil is greatly diversified, from light sandy loams to stiff, blue, yellow, and red clays, varying from those which are fully saturated with lime to such as scarcely contain a trace. It is a wheat-growing county; and on the one-third of the area of the county which is under cultivation this grain is sown to excess.

Basing my estimates on former crops and ascertained exports, I estimate as follows: 41,800 acres, at 15 bushels per acre, give 627,000 bushels. Of this, 45,000 acres, seeded at 1½ bushel per acre, require about 67,500. Twenty-nine thousand inhabitants, at 7 bushels each for bread, is (say) 200,000 bushels. Export 80,000 barrels, at 4½ bushels is (say) 300,000. If there is any error in the above, it must be in the estimate for bread. If I have estimated this too high, the aggregate of the crop is erroneous to the extent of that error, and no more. The export will be fully realized. I have estimated the average yield per acre at 15 bushels. In 1848 it was over *eighteen*. In 1849 there was a great failure, from the rust, &c. It should be borne in mind that where there are new lands, in a state of transition from forest, the *average* of crops is greatly reduced from this cause. Roots, stumps, imperfect tillage, late and imperfect clearing and seeding, in a few fields, reduce very rapidly the average which fully-cleared lands would show. In this county many fields produce from 20 to 25 bushels per acre. In 1848 I saw hundreds of acres which yielded from 20 to 35 bushels per acre.

Wheat.—The cultivation of wheat with us is very simple. With our best farmers, on their lime stone lands, this is the course: say a new field is cleared and sown in wheat in September, 1850; in February or March, 1851, clover-seed is sown among, or on, the wheat; the wheat will be harvested in July; hogs then permitted to glean the field, and the clover may be pastured very lightly. In May or June, 1852, there will be a crop of clover suitable for mowing for hay. When this is removed another crop of clover starts immediately, which by September is covered with ripe heads, full of seed. This crop, seed and all, is ploughed under; wheat sown on the single furrow, and harrowed in. In July, 1853, this wheat is harvested; in September the stubble is ploughed in, and wheat is again sown on the single furrow. The clover-seed which was ploughed under in the heads in September, 1852, having been brought near the surface by the ploughing in September, 1853, will vegetate in the spring of 1854, and produce a new crop, which should be treated in the same manner as the first. Thus a crop of wheat is followed by a crop of clover; this by two crops of wheat and one of clover, in succession, without any additional sowing of clover-seed. Under this course the land is constantly increasing in fertility. In some situations an occasional dressing of lime is necessary to prevent an excess of vegetable fibre.

The varieties sown are numerous. The large amount of harvesting, and high price of harvest hands, have caused our people to change seed from a single variety to several, which will ripen, in succession, for about four weeks. The Mediterranean is an early variety, seldom injured by the fly, and ripens well when down; hence it is extensively cultivated. Several varieties distributed from your office did well until stricken down by the rust of 1849. The best remedy against the Hessian-fly is late sowing—25th September till 1st November. Usual time of seeding, from 25th August to 10th October; of harvesting, all July. Our seed wheat is sown without any preparation, except that which it receives from the threshing machine or fanning mill. One or two bushels are sown to the acre—average, one bushel and a half. I wish here to record a fact in relation to seed wheat. It is this: *one-third of all wheat threshed by a threshing machine will never vegetate. Its vitality is entirely*

destroyed. Hence wheat thus threshed should never be used for seed. If it is, the owner becomes a loser in seed and in his subsequent crop. Depth of ploughing, about five inches. Average price, 65 cents per bushel.

Corn.—The best varieties of corn are yellow gourd-seed and hackberry. Average yield per acre, 35 bushels. The cost of production depends on the value of the land, nature of the soil, distance from market, &c. The usual price is 25 cents. The average cost of production I set at 24 cents per bushel.

The entire crop is fed, raw and unground, to stock, except what is eaten by our citizens, and that is a small portion. Eight bushels of corn in the ear are allowed to each fattening hog. This will generally double his weight from the commencement to the close of the feeding. I believe if the cobs of these eight bushels of corn were carefully saved, with all the excrements, solid and liquid, and carefully mixed, daily, with suitable absorbents, the aggregate would be about five-fold the bulk of the corn. These 40 bushels of compost, spread on a common soil, would, agreeably to some experiments of my own, increase the crop about five bushels the first year, three the next, and two the next—10 bushels. Spread raw, the result would be a little less; but the effects will be perceptible for five years. While on this subject, I will venture the opinion, that the excrements of a man, fed entirely on unbolted wheat-bread and water, if saved and properly applied to a suitable soil, will produce an aggregate of wheat greater than the amount fed.

Barley, Rye, and Peas are not cultivated. A few *beans* are grown.

Oats are considered too exhausting a crop, and interfere with the rotation above described; hence, they are not much cultivated.

Grasses.—Our meadows consist of red clover, timothy, red-top, and a little blue grass. Average yield per acre, at one mowing, $1\frac{1}{2}$ ton. Many of our upland farmers dispense with all meadows, and cut no hay, except the clover, in their wheat rotation. The quantity of seed sown varies from five to ten pounds per acre.

Tobacco.—Yellow tobacco is grown to some extent on our new lands.

Root Crops.—None grown, except Irish and sweet potatoes—the latter the most profitable; at 50 cents per bushel for each.

Fruit Culture.—The cultivation of fruit is receiving increased attention. I am of the opinion that apples may be grown to a greater profit, for stock, than any other agricultural product; and that, bushel for bushel, the advantage is in favor of apples over potatoes.

A fruit tree, planted on a well-drained *poor soil*, will seldom suffer from blight of any kind. Too much trimming, too much moisture, and too rich soils are, in my opinion, some of the causes of blights in pear and apple trees. I believe there are several varieties of blights in apple trees, and probably in pear trees also. I think I am in possession of facts and observations which will explode all the *blight theories* which I have seen published.

S. A. BARKER.

MICHIGAN.

TROY, OAKLAND COUNTY, MICHIGAN,
November 20, 1851.

SIR: Your Circular of August, 1851, has been forwarded to me by Hon. K. S. Bingham. I desire to add my mite to the mass of valuable information collected in your excellent Agricultural Report.

Agriculture has been my study and employment for a number of years. I emigrated to Michigan 30 years since, when it was a wilderness, and have continued in the same employment, on the same farm, since that period.

The staple productions of this county, and of the whole State, are wheat and wool, and beside these are the various articles adapted to the climate and soil.

The true policy of a good farmer is to cultivate a proportion of all the different and various crops, and to rear a portion of the different animals well calculated for the climate in which he resides.

Wheat.—Oakland county is appropriately named—three-fourths of the land in the county being oak openings; the soil is impregnated with lime, and well adapted to wheat. One-fourth of the county is heavily wooded land, covered with linden, ash, white and black walnut, &c.—little or no maple or beach.

I have raised, for 20 years past, from 500 to 1,000 bushels wheat per year, and have made this valuable article my study, both in its character and cultivation. We have all the different varieties raised in the northern and eastern States. Some years ago the red chaff bald wheat was all the go; it is now in disrepute. I have raised the white flint, which does well. I am quite positive, from accurate experiment, that barn-yard manure will greatly increase the straw, and not add as much to the grain as some other manures. It will be a most valuable discovery for some Liebig to inform farmers what will increase the berry in wheat, when they can so easily add to the straw. Some years since I carted 400 loads of barn-yard manure upon 5 acres of land, and the result was an immense crop of straw, and not more than 20 bushels per acre. I have tried corn-stalks, and consider them a valuable manure In passing through Indiana and Illinois, I was struck with the suicidal practice of burning the corn-stalks. It looked like working a first-rate horse hard all day and turning him into the stable to starve.

The French near Detroit river, in old times, hauled their manure from the barn-yard on the ice, in the winter, to pass off in the spring. That was not more strange than to see large fields of corn stalks burned on the land. The time will come when the prairie farmer will rue such practice. I have found that a strong clover-sod, well turned, 8 inches deep, and properly cultivated, is a profitable and economical method of raising wheat. The practice of summer-fallowing is not as much followed as formerly. The wheat crop of 1850, in Michigan, exceeded anything ever before raised. The weather, in May and June of that year, was attended with a severe drought. At one time a general failure of the crop was apprehended; but that Being who governs the weather so directed, that every garner was full. Thirty bushels per acre was an average in this neighborhood; and to thresh 400 bushels per day, with a common thresher, was very common. The crop this year is remarkable

for heavy straw, but will not yield as much as last year. With all the manuring and cultivation, much depends upon the weather. We generally have a fine plump berry, yielding a barrel of flour from $4\frac{1}{10}$ to $4\frac{3}{10}$ bushels. The price this year is low, ranging from 50 to 60 cents per bushel. We plough from 8 to 10 inches. I find deep ploughing indispensable to a good crop. We have not, for years, been injuriously affected by the fly, and the weevil has never crossed Lake Erie.* Our winters are generally favorable to wheat. We sow, between the 5th and 25th of September, from $1\frac{1}{4}$ to $1\frac{1}{2}$ bushel per acre. We have never used guano. I believe the yield per acre is increasing, arising, in some measure, from the more perfect system of cultivation. This beautiful peninsula may well be depended upon for wheat.

Corn.—Corn is increasing in quantity, and, from the mode of cultivation, bids fair to rival wheat. I commenced the last of April, this year, turning over an old pasture, containing 20 acres, with two ploughs. To one I attached three horses abreast; to the other, two yoke of oxen; ploughed 7 and 8 inches deep. I then harrowed the sod with a thirty-tooth double harrow, and commenced planting on the 14th of May; planted the "white-gourd seed," 4 and 5 kernels in a hill; hills 4 feet apart. I hoed the corn once, and continued with a single-horse cultivator, and passed through each way. We have housed 2,300 bushels of ears (sound corn) from the 20 acres. The price in Detroit, 20 miles distant, has been 40 cents per bushel during the last summer. I believe it a more profitable crop than any we have. I have a large amount of fodder from this lot, equal in value to one-half the hay raised from the same quantity of land immediately adjoining. Cost of production is $12\frac{1}{2}$ cents per bushel. I feed the corn whole and raw; but I believe grinding corn for hogs will pay the expense. This corn is softer than "flint," and more easily masticated; is sweeter, but perhaps not so fattening. It yields more than flint-corn—$1\frac{1}{2}$ bushel of ears making a bushel of shelled corn, which will make my crop 1,534 bushels; equal to 76 bushels per acre.

Sheep and Wool.—Wool is the most profitable article raised by Michigan farmers. More cash is realized from the same amount of labor than by any other article. I began, in 1828, with 18 sheep. I have not purchased any since; have killed and sold 500, and now have 450. The full-blood Spanish merino is the sheep for us. The wool improves in quality, and they become very fat and hardy. Wool varies like other crops. Some years the same number of sheep—say 300 head—will fall short 100 or 150 pounds, and with the same keeping. Why it is so, I cannot tell. I sheared, last spring, 345; 100 were lambs a year old. I had 1,005 pounds of wool, and sold it at Pontiac, our nearest market, for $45\frac{1}{4}$ cents per pound. My lambs have paid the pasturage and wintering of the flock, and I have the wool net profit. I have over three-fourths the number of lambs to the whole number of ewes. Merino can be raised as cheap as other wool, excepting the large Leicestershire, whose fleeces are from 12 to 18 pounds each; wool coarse and long; profitable for worsted. My success with sheep is common with hundreds in this county.

[* If this statement be true, the fact that "the weevil has not crossed Lake Erie," or is found west of it, is important in the history of that most destructive insect.]

Oats, Barley, Peas, and Beans.—Oats is a good crop here. We can raise from 50 to 60 bushels per acre. I have always considered oats exhausting to the soil. They are not cultivated to the same extent as in other States.

Barley, Peas, and Beans are produced to some extent.

Clover and Grasses.—We cut from $1\frac{1}{2}$ to $2\frac{1}{2}$ tons per acre, according to the season. This year our hay was equal to $2\frac{1}{2}$ tons per acre. We sow four quarts of clover and four quarts of timothy seed per acre. Our best fertilizer is plaster from Ohio, and Grand Rapids, in this State.

Dairy Husbandry.—This county is not considered a dairy county, although butter is made to some extent; not much cheese. Farmers are so much engaged with wheat and wool, that not much attention is paid to the dairy.

Neat Cattle.—Our cattle cost more at three years old than they are worth in market. It is worth $18 to raise a steer until three years old, and he will sell for only $14 or $15.

Horses.—It has become quite an object to raise horses. A good three-year-old colt will cost little more than a steer, and is worth four times as much. Good matched young horses command a fine price and ready market. I have a stud of Arabian blood, bright bay, of the third degree from a horse imported by Mr. Cox, American consul at Algiers, and find no difficulty in getting $100 for his colts at four years old. Brood-mares should be turned to a stack, and fed on the ground through the winter.

Hogs.—I purchased some of the first Berkshire hogs brought into Michigan; paid $20 for two pigs three weeks old. The breed is too small, and is now nearly extinct in this county. We have the Byfield and Leicestershire hog. He will weigh, at 18 months old, from 350 to 400 pounds. The best food for hogs is boiled potatoes, and ground buckwheat mixed with the potatoes when hot. To fatten hogs successfully, their food should be changed at every mess: corn, buckwheat, barley, and boiled apples, &c., alternately; feed often, as much as they will consume.

I wish to give you an excellent plan for *churning milk*. It is simply a motive-power, similar to the one-horse power for threshing, or sawing wood, on a small scale, for a *dog:* endless straps of harness-leather nailed to lath. The straps run around a number of cylinders in a row; a box confines the dog, and he trots off, making the dasher fly. We procured one this fall; and every farmer who loves his wife will have his dog churn his butter.

Very respectfully, yours,

STEPHEN V. R. TROWBRIDGE.

NORTHVILLE, WAYNE COUNTY, MICHIGAN,
December 20, 1850.

SIR: Our wheat crops this season are the largest ever raised in this part of the State. The average product per acre will not vary far from 20 bushels. No guano is used here in raising wheat or other crops. Time of sowing wheat, from the 5th to the 20th of September. Time for harvesting varies with the season—from the 5th to the 20th of July.

The common manner of preparing the ground for wheat is to break it up in May, or early in June, 7 or 8 inches deep; afterward, till with a cultivator, or harrow, to keep down the weeds and grass. About the 1st of September the ground is cross-ploughed, and is then ready for the seed. On our plains and openings one ploughing and a fair use of the cultivator are all that is considered necessary. From $1\frac{1}{4}$ to $1\frac{1}{2}$ bushel per acre is the usual amount sown. The yield per acre is increasing, owing, no doubt, to a more perfect system of tillage and rotation of crops. The most approved rotation of crops is clover, wheat, corn, and oats. Plaster is much used on clover.

The weevil has not made its appearance in this State—at least to an extent to injure the wheat crop. The Hessian fly—one of the greatest enemies to our wheat-growers—visits us at intervals of from 4 to 6 years, continuing its ravages through two or three seasons, and then apparently disappears.

I have observed that samples of wheat received from the Patent Office, or other distant parts of the country, and sown here, have almost invariably escaped the ravages of the fly; while our common wheat was almost entirely destroyed. I therefore think that a frequent change of seed-wheat is one of the most efficient guards against the fly.

Corn is cultivated here to a considerable extent. The most approved varieties are the Dent, eight-rowed yellow, Dutton, and white flint. The yield this season is 25 per cent. below that of last season; average yield per acre, 30 bushels; cost of raising corn the past season, including interest and taxes on land, about 20 cents per bushel; price, at nearest market, $37\frac{1}{2}$ cents per bushel.

My system of corn culture is to plough early in May, pulverize thoroughly with a harrow, then lay the ground off in ridges $3\frac{1}{2}$ feet apart at the top; plant about the middle of May, in rows $3\frac{1}{2}$ feet apart across the ridges. The after-culture is performed almost entirely with a plough and cultivator.

The early part of the season was favorable for the *oat* crop; but the drought, at the time of filling, materially affected the yield. Average product per acre, 30 bushels.

Barley, Rye, Peas, and Beans are not raised in sufficient quantities to furnish data for estimates.

Clover is more natural to our soil than the grasses. The yield will not vary far from 2 tons per acre. The quality is indifferent. Clover was badly lodged; and, in consequence of wet weather, was not well cured.

Dairy Business is not carried on very extensively in this place; most farmers, however, make some butter for market. Common price of butter, $12\frac{1}{2}$ cents per pound.

Neat Cattle.—The cost of raising neat cattle until three years old is about $15. They are raised, to some extent, by most of our farmers, for the purpose of converting waste fodder into cash. Average price at that age, from $14 to $20. Price of good dairy cows, from $18 in the fall to $25 in the spring. A commendable zeal has of late been manifested in the improvement of our stock. Several fine specimens of the Durham and Devon breeds have been introduced among us, which will, no doubt, make a very decided improvement in our stock of cattle.

I kept two calves together through the winter—one, a native; the other, seven-eighths Durham—and am satisfied that the same amount of feed gave at least one-fifth more meat in the Durham than in the native.

Raising Horses is a good business with us. The cost of raising a colt until three years old is not far from $40. Price, at that age, from $60 to $85, according to the quality of the animal.

In this State farm labor is scarce, and land cheap.

Wool-growing is undoubtedly the most profitable business that farmers can engage in. The high price obtained for wool the past season has induced farmers to engage more extensively than heretofore in this branch of husbandry. Large numbers of fine-woolled sheep have been introduced among us during the year from Vermont and other places, for the purpose of improving our stock of sheep.

Common-sized sheep, of fine wool and long staple, are the most profitable. A pound of wool can be grown on a cross of the French and Spanish merino as cheap as on our common coarse-woolled sheep. The proportion of lambs annually raised to that of ewes is two to three.

Hogs are raised by almost every farmer; but pork-raising for the market is not generally a profitable business with us. The best breeds raised here are the Berkshire, with the Leicestershire and Byfield. Our method of making pork is to keep the hogs in clover pasture, feed them with the refuse from the kitchen and dairy until fall; then shut them in pens or small lots, and fatten on corn. We put our pork down with salt in barrels, and cover it with strong brine. The hams are cured in a pickle made of common salt, saltpetre, and molasses; and then thoroughly smoked.

Roots are not generally raised as a field crop. Enough are generally raised by most of our farmers for family use.

Potatoes have sufficient security from the wet this season. I can form no correct estimate of the yield this year, and, consequently, of the cost of production.

Fruit.—The cultivation of fruit is receiving increased attention. Young orchards, of large size, have been planted by many; and old trees, bearing natural fruit, have been yearly grafted with most approved varieties.

We consider the Rhode Island greening, northern spy, Spitzenberg, Swaar, Newtown pippin, and Roxbury russet among our best varieties for winter use and exportation.

Manures.—Plaster is used extensively on the clover fields; barn-yard manure in the production of corn and wheat. I have made use of swamp muck with the most satisfactory results, especially on root crops. It should be hauled into the field in the fall, thrown into heaps, and left to the action of the frost until spring. It can then be spread over the land, and ploughed under, as barn-yard manure. This is a powerful manure,* and has not received the attention from farmers that its merits demand.

We do not feel the necessity of applying fertilizers to our soil, in order to secure a good crop, that is felt by farmers in the old-settled parts of our country. Our land is new, and yet under the influence of the vege-

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[* Very few farmers who have tried "swamp muck," or marsh mud, *alone*, will concur with our correspondent in regarding it as a powerful manure. Composted with ashes or lime, or with stable manure, it is a valuable assistant in yielding the food of plants.]

table matter that, in the state of nature, was spread over its surface—the probable accumulation of ages.

The State of Michigan is yet in its infancy; but her resources have been developed sufficiently to show that she possesses all the elements of future agricultural greatness. With a soil naturally rich and productive, and a population eminently devoted to agricultural pursuits, she is destined to occupy a prominent position in this great republic. I would suggest that, with the facilities which we now possess—by means of railroad and other communications with the East—for exporting neat cattle and horses, and in consequence of the low prices of produce, particularly wheat, our farmers would find it much to their advantage to turn their attention now to raising stock.

Respectfully, your obedient servant,

J. D. YUKES.

The Commissioner of Patents.

South Nankin, Wayne County, Michigan.

Sir: In your Circular for the present year, you invite farmers to answer certain questions therein propounded. I will endeavor, in my poor way, to answer some of them that relate to the *potato crop*. Our soil is a light sand. The average yield per acre, taking the town together, does not exceed 150 bushels; the cost of production, 10 cents per bushel. The most prolific are the early June, (white,) flesh colored, the long pink-eye, and a large black potato, similar in shape to the merino. The best system in planting is in drills, about 3½ feet apart; last of April, tillage. I prefer a clover sod; it should be ploughed early in October; deep, flat furrows, thoroughly pulverized with a steel-tooth cultivator, the last week in April; strike furrows with a light plough, north and south—(so that the sun can shine on both sides of the rows;) drop the potatoes once in a foot; cover with the plough. Potatoes should be kept perfectly clear from weeds, as the yield depends almost wholly upon this. Manuring should be done, just before the potato breaks the soil, by using green manure, so as to cover the drills from two to three inches deep, which keeps the ground moist just at the right time; and, as soon as the potatoes are large enough, cover the manure with earth, as a preventive of the rot. Use an early variety of potato and plant early.

Respectfully, yours,

HARRY LEWIS.

Hon. Thos. Ewbank,
Commissioner of Patents.

Ann Arbor, Washtenaw County, Mich.,
December 25, 1850.

Sir: In replying to your Circular of August last, I would say that this season has been a very productive one, in this region, for grain of all kinds, and other produce of the farmer; nearly everything of which has commanded a liberal price in cash; so that there has never been a year

of greater prosperity to the farmer than this. Our soil is naturally so rich, and as yet so little exhausted, that but little attention has been paid to manure. Guano has not been used.

Wheat.—The average product of wheat is 22 bushels per acre, and somewhat increasing, owing to improvement in preparing the ground; indeed, some of our best farmers find it very easy, by a superior manner of tilling, to make their average exceed 30 bushels per acre. The best method for fallow is, to plough twice or three times, six to ten inches, or more, deep; harrow well; and sow one bushel and a half to the acre, with a cultivator, from September 1 to October 5. Early-sown generally best. I wait until after the frost, to avoid the Hessian fly, which has not been troublesome lately. It is also a great benefit to keep sheep on the fallow whenever the feed will support them. Average price of wheat this fall, 60 cents.

Corn.—Average product of corn this season is about 40 bushels per acre, costing about 25 cents, exclusive of use of the land to raise it. Best method to feed is to grind and cook; but we generally feed in the ear.

Oats yield about 40 bushels to the acre; *barley*, 35; *rye*, 30; *beans*, 20. *Peas* did better the past year; but, from the frequent failure, few were sown. Oats most injurious to the land; barley, peas, and beans leave it in a good state for wheat.

Hay.—We cut from one and a half to two tons per acre. Clover is the best fertilizer.

Cattle do well in clover pastures; but sheep like herdsgrass or timothy.

Dairy.—Average cost of rearing calves until three years old is $12, which is about their worth; good breeds, worth $16; new milch-cows, worth $15 to $25. I give the product of my neighbor, who supplies me with cheese. He has ten good cows and ten ordinary ones, from which he has made, from 1st May to 1st December, 6,600 pounds cheese—about 330 pounds per cow—and 400 pounds butter, before and after making cheese.

Raising Colts is profitable; it costs but little more to raise a colt than a calf; they require but little care, except giving them and the mares good feed. It is well to halter-break them the first winter, bit them at three years old, and harness with a strong, gentle horse, and drive without a load until they become gentle and thoroughly broken; avoid using the whip, if possible; kind treatment by far the best; colts, like children, are easiest governed by kindness with firmness.

Wool-growing is very profitable, quite as much so as any other branch of business. It is very extensively carried on in this vicinity, and is on the increase. With wheat, it is the great staple of Michigan. Cost about 15 cents per pound to grow common native wool or Paular merino; other merino 18 cents. Saxony 30 to 35 cents. Large sheep are most profitable for mutton, and those with heaviest fleeces for wool. There was little difference of price between coarse and fine wool the past year. Any kind of clear wool sold for 35 cents, while the very finest sold for only 40 to 45 cents. Native and Paular ewes will rear about their own number of lambs, while Saxony and small merino will not average over half their number; and they require a great deal of care during the winter.

Hogs.—I see by the pork brought to market this fall that our hogs are again improving. The Leicester, Byfield, and cross are the most esteemed. Best method of putting up pork for family use is to take out all the bone and lean meat, pack the side pork with rock-salt, and cover with strong brine. Hams and shoulders should be divested, as much as possible, of the bone; then packed in a molasses hogshead, covered with a brine made of eight pounds rock-salt, five ounces saltpetre, two quarts molasses, three large raw peppers, three gallons water, to 100 pounds. Heat and skim it. Keep in brine three weeks, then smoke thoroughly with cobs or hickory chips, and keep them from the flies.

The Culture of Fruit is receiving increased attention, and is becoming a very profitable crop, particularly good varieties of apples, peaches, and pears; all of which do remarkably well.

Russets, greenings, and Spitzenbergs are among the best varieties for keeping. The bellflower, gilliflower, and Newtown pippins are about the best for exportation, perhaps. The last is the very best. In conclusion, allow me to say that, by comparing the statements in your last Report of the amount of produce in the different States, and by my own observation, I am more than ever convinced that this county in Michigan is one of the best, if not the very best, county in the Union for the farmer; and I should advise the young men of New England, instead of slaving themselves in fertilizing the rough sides of their mountains, or waiting for their good old fathers to die, so that they may divide with their brothers or sisters their already small and worn-out farms, to come to Michigan and secure to themselves a better and larger farm than their fathers ever had—each taking care, before starting, to engage a good, industrious daughter of one of his neighbors to come on as soon as he gets his first wheat field enclosed and his log-house built.

Respectfully, yours,

WM. S. RAYMOND.

Hon. THOS. EWBANK,
Commissioner of Patents.

ADRIAN, LENAWEE COUNTY, MICHIGAN,
December 3, 1851.

SIR: The state of agriculture in this county is constantly improving. Hitherto the *wheat* crop has been almost the sole reliance of the mass of our farmers, and the principal effort has been to put in as large an amount of it as possible, at the least possible expense, and to hurry it to market in the shortest possible time. Half-cultivated fields, poor crops, and those often injured from not being secured as soon as they should have been, owing to so much of the labor of the year being crowded into a few days, have been the result. But the opinion is fast becoming prevalent that the wheat crop is the least remunerative of almost anything a farmer can devote his attention to, and the eyes of agriculturists are being turned in other directions for something that will better repay them for their outlay and toil. The cost of raising wheat in this State, including interest on the capital invested in the soil, and excluding the expense of harvesting, varies from 40 to 55 cents per bushel when an

ordinary crop is obtained; and this, where the crop is so uncertain as it is in Michigan, leaves but a narrow margin for profit, the price in market ordinarily ranging between 50 and 88 cents per bushel.

The average wheat crop of this county, which is universally conceded to be one of the richest in the West, will not exceed, I think, 12 bushels per acre for the last 10 years. There are many reasons for this, but I think the most prominent of all is the careless manner in which the wheat field is so generally cultivated. Shallow ploughing, that merely skimmed the surface, successive cropping year after year, until the surface-soil was exhausted, or sowing after corn, first turning under a luxuriant crop of weeds, and leaving weeds and wheat to struggle all through the season for the mastery, may almost be said to have been the rule, and thorough cultivation the exception. As our farmers improve in their circumstances, a great change is observable in this respect. That mode of cultivation—which at present is cheap, but eventually dear, and the prime motive to which is quick returns for small outlays—is being abandoned for a more judicious and less exhausting course. The crop of the present year is probably the best ever raised in the county, and was certainly the best put in. It is difficult to say what will be the average, but I think 20 bushels per acre will not vary much from the truth. The best five acres in the county averaged 55 bushels, but the second best that was reported to the County Agricultural Society averaged only 34½. A great many fields averaged from 32 to 34, and the most of them, too, without unusual cultivation. On almost any of the cultivated lands in this county there is no difficulty in raising from 20 to 35 bushels of this grain per acre, by proper cultivation, when the season is favorable. Still our open winters always render the crop an uncertain one, and make it the interest of the farmer to devote his attention more particularly to other branches of agriculture. Of the varieties raised, the Mediterranean would seem to be the most profitable, were it not that the dark color of the flour detracts greatly from its price in market. It is the most certain to produce a good crop of any kind with which we are acquainted here, and ordinarily weighs heavier than any other; but it is never a favorite with the pastry cook, and commands in market about six cents per bushel less than the white varieties The white-flint is a very general favorite, but the Siberian and Soule's varieties are perhaps equally so.

Wool.—Next to wheat, wool is now the most important crop raised for sale in this State. The kinds of sheep kept are mostly of the coarse-wool varieties, with some small proportion of Saxon and merino blood; but the imported breeds are fast being introduced from Chautauque county, New York; from Vermont, and other portions of the eastern States; quite a number of Paular merino, and other fine wool bucks, have been brought into the county the present year. A better quality of wool is now every year exported, but buyers make so little difference in the price as rather to discourage than encourage this state of things, and to induce many to incline to the long coarse-wool breeds. But more care and discrimination are observable every year in the purchase of this commodity.

The quantity of wool purchased in this village the present season was 170,000 pounds, at an average price of 39 cents. There are several other villages in the county; but, as near as I can ascertain, the above amount is full three-fifths what was purchased in the county. This is an increase of about 33 per cent. on the purchases of last year. A large

amount is retained for home manufacture, but it is impossible to say what proportion of the whole clip. The population of Lenawee county is less than one-fourteenth of the whole population of the State. Beyond question, more sheep are kept here, in proportion to population, than in newer counties; and I doubt if it would vary much from the fact if the amount of wool exported from this county should be set down at one-tenth the total sales of the State. An estimate on this basis would produce the following result, and show the vast importance of the wool crop to this State:

Exports of wool from Lenawee county	280,000	pounds.
Cost, at 39 cents	$109,000	
Total exports from the State	2,800,000	pounds
Cost, as above	$1,090,000	

The clip of another year may not bring so high a price, but it will certainly be larger in amount than the figures above given. The wool-growers of Michigan possess an advantage over those of the eastern States which will not fail to be soon appreciated. Owing to the cheapness of land, they require a capital of only from 20 to 50 per cent. of the amount needed further east; and from the more mild and open character of our winters, they can produce the same amount of wool at a cheaper rate. They can then sell it at prices differing only nominally from those paid at the doors of the manufacturer.

Corn.—The quantity of corn raised is constantly increasing. The season this year was wet, and the crop comparatively a poor one—probably not averaging over 30 bushels per acre. The white and yellow Dent are raised principally, and yield better than other varieties. A good deal of this county is naturally well adapted to the growth of corn; and, with proper cultivation, in favorable seasons, crops of from 75 to 120 bushels may be raised. The best 5 acres raised in the county this year averaged 77 bushels per acre. The average price this fall has been about 33 cents; and, at this price, it is considered more profitable to raise than to grow wheat at 75 cents. Taking one year with another, the labor and expense that will be required to raise 10 bushels of wheat will be sufficient for the production of 25 bushels of corn. The great bulk of the corn raised is fed out at home to hogs, cattle, and horses; but a large amount is also exported. Taking one year with another, there is undoubtedly now more corn than wheat raised in the State, and I think there is more even this year.

Barley.—But a trifling amount raised—little more than sufficient to supply the two or three breweries in the county. Price, about 38 cents.

Oats.—This grain is raised principally for feeding horses, and is more relied upon as food for them than any other. The amount raised is from 30 to 60 bushels per acre, and it varies in price from 18 to 30 cents, averaging about 22. Our best farmers do not ordinarily raise much for sale. Corn is quite as profitable, and less exhausting to the soil.

Rye.—None of consequence raised. It brings, in market, about the same price as barley, and is raised at an additional expense of probably 50 per cent.

Potatoes.—A larger proportion than usual of this vegetable was destroyed by the rot this year. On sandy soils the disease was less prevalent than elsewhere; but no kind of soil seems to be entirely exemp

from its ravages. Potatoes are now bringing 50 cents per bushel; which is about twice the usual price. No remedy yet devised for the disease seems to be effectual.

Sweet Potatoes.—But two or three years have elapsed since people in this county commenced the cultivation of this root, and then only as a garden vegetable. On dry, warm, sandy soil, it is productive, and grows to a good size; but the experiments made, as yet, are on a very limited scale. Price in market, from 6 to 8 shillings per bushel.

Other Root Crops.—Beets, carrots, turnips, and cabbages are, in general, raised only for consumption in the family. The importance of root crops for feeding swine and stock does not seem to be generally understood; and corn, oats, and other more expensive feed are more used. Even potatoes, though raised at a much greater expense than carrots or turnips, are yet more generally used than both together. The cultivation of the ruta-baga turnip is, however, increasing, as is also that of the carrot, to a less extent. This last, for milch-cows, is usually considered the best of the roots.

Hay.—The crop of hay the present season is about an average one. A good portion of this county is well suited to the growth of the grasses, and from 1 to 3½ tons per acre (depending principally on the manner in which the soil is cultivated) are raised. Some little corn is sown broadcast for fodder, but to no great extent. The price of hay this fall averages about $6 per ton.

Manures.—But a small portion of our farming lands, as yet, needs manure; but the difficulty is in stopping the exhausting process when once begun.

Clover is quite popular as a manure, particularly for wheat; and some of our farmers never sow wheat without also sowing clover, either for a change of crops or for turning under, as a preparation for wheat again.

Buckwheat is sometimes sown for the same purpose; but the manure principally used is the farm-yard manure; and farmers are beginning to employ much care and pains in properly preserving it. But little, comparatively, is now wasted. That made in villages is generally either given or sold to farmers in the vicinity, and thus turned to good account.

Plaster is used, but not to the extent needed—particularly upon the worn-out lands. I say worn-out lands; but this may seem a very strange term to apply to soil that, 25 years since, had never felt the pressure of the white man's foot. In truth, we have, as yet, no worn-out lands; and those farms which appear such are only those which, year after year, have been skimmed over by those who have held the honorable name of farmer, and subjected the soil to the sluggard's cultivation, or the careless man's ill usage. Ordinarily, deep ploughing, and a little plaster, or a proper dressing of other manures, will induce such land to return thirty or fifty fold, while, for such fellows, it had reluctantly yielded five or ten fold.

Agricultural Society.—There is established in this county an agricultural and horticultural society, which is accomplishing much good. It distributed this season $588 in premiums, and its annual fair would have done no discredit to any county in the valley of the Genesee.

Very truly, your obedient servant,

THOMAS M. COOLEY.

Hon. THOMAS EWBANK,
Commissioner of Patents.

INDIANA.

LA PORTE, INDIANA, *December* 3, 1850.

SIR: This being a frontier county of our State, although possessed of many natural privileges—such as nearness to a good and ready market, a rich soil, good, natural roads, &c.—yet our population is so fluctuating, that, for many years to come, we may not arrive at much excellence in agriculture or manufactures. Notwithstanding this, our exports are very considerable—especially if we take into consideration the comparatively high cash price which our agricultural products bring.

First, as to our crops:

Wheat.—The wheat sown down in autumn, 1849, made a fine appearance before the winter set in; and, the winter being favorable for the young wheat, its appearance in the opening of the spring was also auspicious. The coldness of the spring, and its lateness, were favorable; the warm rains and warm weather in June caused a most rapid growth, which pushed it principally out of the reach of the rust; which, in this county, did but little harm, either to winter or spring wheat; which we will now show: our county contains about 350,000 acres; of this, one-seventh was estimated to be cultivated in wheat and corn—20,000 acres wheat, and 30,000 corn.

The wheat crop averaged about 25 bushels per acre; making 500,000 bushels; its average weight 63 pounds per bushel; at 60 pounds per bushel, standard, we have 525,000 bushels. Deducting 25,000 bushels for consumption, we have for market 500,000; the average cash price at Michigan city is 70 cents per bushel; equalling the amount of $350,000 for wheat.

The specimen of Troy wheat received from the Patent Office I had planted 21st October, by a careful wheat-grower. Mr. G. Rose, of this county, informed me, when east, he purchased some wheat at $6 per bushel, called *Troy* wheat, and had it sown by way of making experiment. It *may* be the same kind I received.

Corn.—This crop, I said, covered about 300,000 acres; its average product per acre is, by estimate, 40 bushels; average weight per bushel, 62 pounds. The standard weight in market is 56 pounds per bushel; amount of measured bushels is 1,200,000; overplus in weight is six pounds each bushel, 129,000 bushels; this added to the measure, 1,390, marketable weight; deduct for home consumption, 30,000 bushels, and we have for sale 1,360,000 bushels for market. This season, so far, new corn is at the average price of one-third of a dollar per bushel. The amount of our corn-crop in market will be $450,000; this added to the receipts for our wheat, gives us $780,000. I will, out of this, make a large deduction of $30,000—the *gross* expense of seeding, harvesting, and threshing, and carrying to market—which leaves the net sum of $750,000. In my estimate of expenses, we must take into consideration the rapidity with which a crop of wheat may now be seeded, harvested, threshed, and cleaned, compared with the tardy way in which all these operations were performed ten years ago, and we cease to wonder at the small expense of corn. The most tedious operation is the shelling of it; by machinery, 1,000 are shelled in two or three days.

Potatoes.—This crop is safer from the rot than heretofore. The portion of the crop which has been most affected by the rot is the mercer

potato. The pink-eyes, both kinds, the black Meshanock, (so called,) and the red potato are free from the disease, and are very good and abundant; price, 25 cents per bushel. Sweet potatoes abundant and very good; average price, 38 cents.

The crops of *oats* and *barley* are short, being much injured by the drought about the middle of June. The heavy warm rains at the close of the month, though they made the corn, were injurious to the oats and barley, which had their growth.

I may remark here that the crop of *wheat* now in the ground looks admirable, and is quite a large crop; no fly or worm has yet molested it. The varieties of wheat sown are the Mediterranean, which is a hardy grain, not subject to be injured by the fly or rust; it has a hard, strong stalk, and produces heavy crops. The next best for this climate and soil is the white-chaff bearded wheat, a different variety from the Troy wheat; its yield is not equal to the Mediterranean. The third variety is the Canada; its best quality is that it resists the winter's severity. The fourth is the yellow lammas; it produces good flour. Another variety introduced is the Hutchinson; its quality is not known. The depth of ploughing for wheat depends upon the character of the soil. The amount of acres cultivated in wheat and corn, and harvested, cannot be noticed in the United States marshal's report. Other matters, which I have reported in this connexion, seemed to me inseparable from the estimate. The soil is of four varieties—prairies, burr-oak barrens, oak openings, and the thickly timbered land, covered with poplar, sugar maple, walnut, white pine, oak, aspen, and a variety of small under-growth, all rich; but perhaps the prairies have the deepest soil, and produce the heaviest crops of corn. Three methods are adopted in seeding down wheat. Three times ploughing are considered necessary in fallows. One method of seeding is to harrow the seed thoroughly; another is, after the second ploughing, to harrow well the ground, sowing broadcast, and *ploughing* down the wheat. The third plan, and the best, is to prepare as in ploughing, and then seed with a drill. It is alleged that this resists the frost, and is not so much exposed to the bleak winds of the winter when the ground is bare.

Let me say a word or two about culture of corn. The two varieties of corn are white and yellow; but a better than either seems to be a mixture of the two. In a field which a neighbor cultivated, and which I saw when planted, consisting of 90 acres, corn was produced, the ears of which were about 10 inches in length, with 20 rows filled closely to both ends; of mixed seed, and somewhat indented like ground seed; long grain, and small cob; the average per acre, 50 bushels. This was on prairie land. Rotation in crops has not been much attended to as yet. This is much to the injury of the soil, both in impoverishing it and in causing it to become foul.

Cattle.—In the feeding of cattle heretofore, the usual method has been to turn beef cattle for market into the corn-fields at a certain season, when the corn is out of the milk; and hogs, also, are fattened in the same way. In this way of fattening no estimate can be made. Young cattle, of 3 years old, average $15 per head. Fat hogs, 18 months old, weighing 200 pounds, $2 50 to $3 per hundred. When otherwise fattened than as above, the grain is ground.

Wool.—Whether this will become a grazing county or a profitable wool-growing county, cannot yet be decided. This is, however, certain: wool commands a ready sale and fair price; average per pound, 33 cents.

Pork.—Mess pork, put up in good barrels of 200 pounds weight, is worth per barrel, at home, $8.

Fruit.—Our county will excel as a fruit-bearing county. This year the fruit is abundant. A gentlemen from this county carried some fruit—apples and pears—and obtained the 2d premium therefor, at the Cincinnati great fair, during October last. Excellent grapes—Isabella, and some other varieties—have been in great abundance this year.

The amount of iron cast at the furnace in La Porte this season is above what it was last year considerably, perhaps as high as 1,000 tons. a large portion of which is hollow ware and stoves, which find a ready sale. Plank roads are multiplying from this place as a centre. A *railroad* (the Mississippi and Buffalo) will reach this place next season.

Observations on Meteorology.

Date.	Highest degree.	Day of month	Lowest degree.	Day of month.	Average time—degrees.	Various remarks on the seasons, &c.
1849.						
Dec., 6 o'clk. a. m....	36	16	10	31	23	16th foggy; on five days rain fell nine inches; snow; calm weather.
1850.						
Jan., 6 o'clk. a. m....	42	18	4	31	23	On five days snow fell twelve inches; weather throughout pleasant.
Feb.....do.....	46	28	10	4	28	Snow fell nineteen inches; one-half clear, the other snowy.
Mar., 5 o'clk. a. m....	46	13	20	4	33	Snow three inches; fine weather for winter crops; winter mild.
April.....do.....	58	27	24	9	41	Dew second day; eight days rain; fine for wheat and grass.
May.....do.....	60	28	34	7 and 8	47	Cold northwest wind twelve days; good for wheat, but backward.
June.....do.....	70	5	46	1	60	Rains on ten days; wheat promising; other crops backward.
July.....do.....	74	13 & 29	56	19	65	1st week, harvest; twenty-one days fine weather; corn grows rapidly.
Aug.....do.....	74	9 & 13	56	31	65	Thirteen days warm rain every day; corn and grass rapidly growing.
Sept., 6 o'clk. a. m....	74	24	40	30	55	Still warm, heavy showers for fifteen days; corn ripening.
Oct.....do.....	68	11	28	7	48	Corn ripe; eight days Indian summer; 8th, first frost; 19th, snow.
Nov.....do.....	60	26	14	17	38	Fine weather for gathering corn; two days Indian summer; crops gathered.
Dec.....do.....	40	2	22	6	31	10th—at this time ten inches of snow; weather mild.

Here I close my communication for the current year. Had I anticipated your call on me for this year, I would have made exertions to have this report fuller; as it is, I thought it would be best not to trouble

you with what would be more fully exhibited by the United States marshal. If the observations on the temperature and state of the weather have anything in them which you consider superfluous, you are the judge of the matter, and can reject what you deem so.

I remain yours, with much respect, &c.,

JNO. C. REID.

La Porte, Indiana, *December* 21, 1851.

Sir: Had time permitted, you should have heard from me sooner, although my essay (if entitled to the name) will be short. Yet I would consider myself inexcusable if I did not comply with your request. There are some things respecting public works, the state of trade, and the future prospect of this region of our State, which may not be uninteresting. The great western railroad from Dunkirk to this place will be finished westward from Toledo by the 5th or 10th January, 1852. The immense revolution which will be occasioned by the completion of this road, together with the competition to which it will give rise, can hardly be calculated.

Heretofore the transit charges upon our produce, amounting to more than 25 per cent., to New York, and the charge on dry goods from New York to La Porte, at from 75 cents to $1 05 per cwt., must be diminished more than 50 per cent. All these abstractions went into the hands of the intermediaries, such as merchants, commission merchants, brokers, peddlers, &c. Our beef and pork will not cost half the price for transportation to market. All this must benefit the agriculturist.

The arrival of the railroad at La Porte has given a spur to all kinds of business; manufactories, with fine public buildings, and many dwellings, have been erected this year. One thing, however, is of dubious utility, which has increased very much in our county, as well as in all parts of the United States: probably double the usual amount of merchantable dry goods has been brought to market here. This inflation of our market by a foreign importation, although it enriches the merchant, impoverishes the consumer, who inevitably pays the duty.

Crops.—I will now proceed to give some account of our crops for the current year. As a whole, our crops have been better, uniformly, than usual. The county of La Porte contains about 500 square miles, or 320,000 acres. Of this 25 per cent. is in cultivation, 25 per cent. marsh lands, which leaves 160,000 acres not under cultivation, of wild land. From the best information I have been able to obtain, the land in crop the season now closing may be classed as follows:

In wheat, 15,000 acres; corn, 40,000 acres; oats, 15,000 acres; grass, 10,000 acres. The average crop of the wheat is estimated at 15 bushels to the acre..... 300,000 bushels.
The corn at 40..... 1,600,000 "
The oats at 50..... 750,000 "
The hay at 1½ ton..... 15,000 tons.

For the current year the prices have been the following average, which I have been curious to ascertain monthly:

For wheat, 67 cents per bushel; for corn, 32 cents per bushel; for oats, 20 cents per bushel; for hay, per ton, $7.

Wool.—I learned from the principal agent for the purchase of wool in La Porte, that 60,000 pounds were purchased this year, at an average of 35 cents per pound. The agents who sent the manufacturer the wool sold it at an advance of about 30 per cent. I am told the manufacturer makes at least 50 per cent. on his purchase out of his cloth. Now, if the cloth is returned in trade for the wool the succeeding year—and this is the fact—how much does the wool-grower lose in the trade? What would be his gain if the manufacturer removed his manufactory to the wool, where living is cheap, and a permanent abundance?

Now, if we have wool, and cotton, and iron, &c., and an abundance of breadstuffs, and every facility of power by steam or water, I ask, Why all this circling of trade? Here comes in the intermediary, or many of them, who pick up a living out of other men's labors; yes, sir, they gather up all the loose specie and carry it off; and the next operation is to shave paper. But there is another deep scheme in operation for the benefit of idle swindlers; and their *patrons*, or *dupes*, are legion in number, and their *palaces* are in every city: I mean here the patent-medicine men, and I ought to include the adulterers of drugs of foreign countries.

The population of our county is rated now at 15,000 inhabitants. The town of La Porte has a population of 2,500. The prospect of the completion of the Buffalo and Mississippi railroad has already raised the prices of grain and pork.

As the thing comes to my mind just here respecting the growth of pork in Virginia and North Carolina, I now advert to it. I find in one of the volumes issued from the Patent Office, that in raising pork for market, or otherwise, they estimate pigs at 18 or 20 months, *fattened*, to weigh, on an average, 150 pounds. Our hogs in Ohio, Indiana, and Illinois, of the same age, uniformly weigh about 250 pounds. The exact reason of this I would like to see explained. It may be altogether in the breed; but why?*

A word more about the prices of grain: From the best information I can get, our corn can be safely purchased at *Rochester*, New York, at 64 cents per bushel, and landed on the wharf at *Liverpool, England*, at $1 per bushel. Here we see that the cost of carrying our corn to Rochester is just 32 cents per bushel. Now, I verily believe that it can be carried to New York city by railroad next season for perhaps less than 32 cents per bushel; then the farmer should receive for his corn at La Porte 64 cents per bushel.

Best flour, per *barrel*, costs from New York to Liverpool, including wharfage and cartage at New York, freight to Liverpool, commissions, insurance, wharfage, &c., 96 cents. Now, a bushel of corn may be set down at one-fourth of 96 cents, which is 24 cents; add 24 to 64, and we have 88 cents. This gives the shipper 12½ cents per bushel. Of course

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[* Pigs in Connecticut, Rhode Island, and Massachusetts frequently weigh 250 pounds when 10 months old, instead of waiting until they are 20 to attain that weight, as in northern Indiana. In all cases it is the neglect to feed high that makes hogs light in weight at maturity; and it is good keeping that gives a large yield of meat in the shortest time, and, usually, at the smallest cost.

See Report of Committee of Brooklyn Agricultural Society, Windham county, Connecticut in which they say that pigs 10 months old weigh, when dressed, 350 pounds.]

this will inevitably produce a final removal of all *intermediaries*, who, like the horse-leech, are never satisfied, but cry, "Give, give!" As for our flour, if we can find consumers in the shape of mechanics and manufacturers at home, we had better let them have it than pay on the wharf at Liverpool cost and charges of various kinds, making the cost per barrel $5 25, and on sale only be able to get $4 50; clear loss, 75 cents per barrel.

I am, sir, now convinced that our region should become a manufacturing district; yet I know, also, that it will not become so immediately. We are convinced that a judicious wool-grower would make more money from 640 acres of suitable land from raising sheep than making corn.

Should this communication reach you, and meet with your favor, I ask your further favor in sending me two articles—a few grains of the Maryland blue-stem wheat, which produced in Caroline county, Virginia, last year 54 to 60 bushels per acre; and, next, a few grains of what is called Lloyd corn—a beautiful white corn, and very productive. It was cultivated last summer in Chester county, Pennsylvania, by five or six farmers. The Troad wheat you sent me two years ago I had carefully sown apart from other wheat, but not one grain sprouted; the reason I know not.

Of the prevailing kinds of wheat sown last year, and harvested the past summer, were the Mediterranean, the white-bearded, the rock wheat, and the Genesee. I saw them all growing in the same field—20 acres of each; all came uninjured to the harvest. The Mediterranean was most productive—produced 25 bushels per acre. The others averaged 20 bushels per acre. All heavy, good wheat.

The variation in the corn crops was occasioned chiefly by bad or good cultivation, ranging from 25 bushels per acre to upwards of 80 bushels.

I have made from my daily minutes of the season thermometrical observations as far as the temperature is concerned, together with the amount of rain monthly; also, the amount of snow during its season. I have no barometer; therefore no calculations from it.

Date.	Average.	Heat.	Latitude.	Rain.	Snow.	Remarks.
1851.	*Degrees.*	*Degrees.*	*Degrees.*	*Inches.*	*Inches.*	
January	25	42	—2	1	8	Mild.
February	28	45	4	3	7	Mild.
March	36	60	16	2	3	Mild.
April	40	54	32	6	1	No more snow.
May	50	65	30	10	—	Birds numerous.
June	60	70	52	2	—	Warm.
July	64	76	56	14	.....	At one time, 12th, incessant rain.
August	65	70	48	7		
September	54	73	40	4		
October	45	60	30	4		
November	34	50	24	.....	.....	Little rain or snow.
December	20	42	—12	11	16	All melted.
				64	35	

NOTE.—The mark — signifies below zero.

It has here been a good crop season. The present winter crop is exceedingly fine.

Our winter, which is thus far pretty severe, is this day quite mild; ground nearly bare; no frost in it.

Of imported goods there has been the amount of from $80,000 to $200,000 worth brought to La Porte.

I am, respectfully, &c.,

JOHN C. REID.

Hon. THOMAS EWBANK,
Commissioner of Patents.

FORT WAYNE, ALLEN COUNTY, INDIANA,
November 20, 1851.

SIR: Your Circular, containing numerous interrogatories, soliciting information on the subject of the agricultural products of the country, came duly to hand; but various causes have conspired to delay an answer until the present moment.

This county (Allen) has a soil adapted to the raising of all kinds of grain, as well as grass.

Wheat.—As a wheat-growing county, the last United States Census shows it to be the second county in the State. The variety generally preferred is the Washington blue stem; the *white* Mediterranean can be sown late, and is preferred by some. The success in the crop, experience has proved, consists more in the thorough method of cultivation than in the variety sown. An illustration of a single instance in our county in 1850 will demonstrate it: One individual sowed about 70 acres; three different varieties of seed—white Mediterranean, and two varieties of red-bearded. The soil was different—one field was hard clay; the other two varied from deep mould to sandy loam. The ground was ploughed twice (summer-fallowed) and harrowed *three* times thoroughly. Product about 40 bushels to the acre. Scarcely any perceivable difference in any part of the 70 acres. This was considered an extraordinary crop. The average produce of the county it is impossible to get at; the yield ranging from 10 to 30 bushels. The yield is on the increase, as we plough deeper, and harrow oftener and better, thoroughly—to pulverize the ground with drag or harrow being one of the great secrets in raising wheat. Add to this early sowing and early harvesting, and the product will be generally satisfactory.

Corn.—Very little manure of any kind is used in raising corn in the Mississippi valley, especially on the river bottoms. Average yield, 40 bushels; cost of cultivation about 12½ cents; average price, 25 cents. No experience in testing the comparative value between raw, cooked, and boiled food.

Oats.—Average yield, 40 bushels. Side oats stand up best, and are most productive.

Barley.—A somewhat uncertain crop.

Beans.—Soil rather rich; continue to grow too late in the season; do not ripen well; yet fine crops are sometimes raised.

Peas.—Commonly a good crop. Average yield 20 bushels; 3 bushels sown to the acre. The bug is very destructive to our early crop. Sow

from 1st to 10th of June, and you escape it altogether. I have tried it. This is an item of information that ought to be extensively diffused, as the pea crop is an important one. It can be grown on almost any soil, and is not exhausting. Average price here, $1.

Grasses.—Clover, timothy, and red top do exceedingly well. Average yield about two tons to the acre. The application of any kind of manure as a top-dressing is valuable. Even straw, carefully distributed in the fall, has shown itself visibly in the crop. I have used plaster this year on a clover field with marked success.

Dairy Husbandry.—Strictly speaking, very little done in that branch. No data worth communicating.

Neat Cattle.—Cost of raising, very trifling. After the first winter they run out in the range most of the grazing season, and in the stalk fields, and to straw mostly during the winter, which is short. For this kind of treatment it is thought grade cattle do best; some fine Durhams, however, are being introduced. Common price of three-year-old steers from $10 to $12.

Horses.—The raising of horses is considered more profitable than any kind of farming business. They are frequently raised in the same manner as I have described in the raising of cattle, and the expense but little more. Price at three years old from $30 to $50.

Sheep.—Very little done at wool-growing. Sheep did not do well when the county was first opened. The wild parsnip, which was somewhat abundant in certain localities, sheep are fond of, and it is very fatal to them. This has deterred many farmers from going into the business. The farmers are now experimenting with more success.

Hogs.—My method of hog-raising is to keep them in clover fields. Sows raise two litters—one in April, and the other in October. Feed the sows and pigs with milk and slops. The April pigs I butcher at 8 months old; the October pigs, at 14 months. I give them a good start, early, with green corn, cut up. They will eat stalks and all. Follow it up with boiled pumpkins and potatoes, giving it more body after the second week with meal and boiled buckwheat, &c., and finish with six weeks on corn and meal. This is my method, which I think profitable. My breed is a cross of the Leicester and Lincoln. I purchased a pair of pigs at the State Fair in New York some three years ago. They keep easy, mature young, and weigh well. The hog I purchased received an injury, and was fattened last fall. He weighed nearly 600 pounds. Other breeds and crosses are preferred by some.

Root Crops.—Do well; but cannot be raised profitably, owing to the expense of raising. Labor is too high for that purpose. Turnips grow well, but are only raised for family use. Price, 12 or 15 cents.

Potatoes.—One of our best crops. The varieties are too numerous to give particulars. Quality fine. Average yield about 150 bushels. Sweet potatoes are raised to a considerable extent, and with varied success; not considered a profitable crop.

Fruit.—All the choice varieties cultivated elsewhere. The "pear blight" and "yellows," on peach trees, are not known among us as yet.

Grapes do well. The Catawba and Isabella are the principal kinds cultivated. The Catawba is rather late; but it surpasses everything else, and is raised as easily as currants.

Very respectfully,

J. D. G. NELSON.

JEFFERSON, INDIANA, *November* 30, 1851.

SIR: I have just received the second part of the Patent Office Report for 1851 from the Hon. J. McDonald, late member of Congress from this district. In regard to the organization of the agricultural part of the Patent Office, I beg leave to offer a few suggestions. Suppose each county had an officer, whose duty should be to report to the Commissioner of Patents, monthly, the condition and prospects of the crops in his respective county—such officers being elected or appointed in all the States and Territories of the Union: the Commissioner of Patents would thus be put in possession of agricultural information the most accurate and extensive.

From these county reports, general State reports could be drawn up and published monthly in Reports from the Patent Office: thus the State agricultural reports of the month of May to appear in the Patent Office Report for June, and those of June in the July Report, &c.; so keeping the people advised of the true state of all the various crops of our widely-extended country, from the time of planting or sowing, through the progress of their growth, to maturity, until they were gathered and saved. I need not say to you that agricultural wealth is the true basis of all of her wealth, individual or national.

Suppose the office of furnishing the Commissioner of Patents these county monthly agricultural reports was attached to the office of county assessor in each county. County assessors are, or ought to be, judicious, practical business men, and competent to estimate and give the county reports correctly; and, in addition to that duty, they ought to be required to ask each farmer, while assessing his property, the number of acres he has in wheat, the number in corn, in oats, in cotton, rice, sugar, &c.; and from these data make out an annual county report of the agricultural productions of the county, the average quantity of grain, or other agricultural productions, per acre, and the sum total of each; which reports should be filed in the clerk's office of each county, and a copy should be forwarded to the Commissioner of Patents, and thus furnish him the proper data for his Annual Report, which would present an accurate account of the number of acres of each article of agricultural production, with the sum total of the entire quantity of each annually raised in the United States and Territories. Thus in a few years an approximate estimate might be made of the quantity of each article of agricultural production consumed, and the surplus, if any, and the deficiency, if any. It is obvious that such information would enable the people to seek the best market for their surplus productions, and the best way of supplying deficiencies when crops fail. It is required, I believe, of consuls abroad to furnish seeds for distribution among the people by the Commissioner of Patents, through the Post Office. It would be well for them, also, to furnish agricultural reports of counties where they are respectively residing. These reports should be monthly, and drawn from the best sources of information in their power. Thus besides a correct knowledge of the agricultural productions of our own country, we would be put in possession of comparatively correct accounts of the agricultural productions of other countries.

Some such comprehensive system of agricultural organization is required in the United States. Hitherto agricultural improvements have sprung mainly from individual effort. Agricultural fairs, agricultural newspapers,

and, of late years, the Patent Office Reports—all these, valuable as they unquestionably are, and have been, are not sufficient to disseminate knowledge of the best modes of culture of the various productions of our widely-extended country. This, it may be said, would not disseminate such knowledge. No, it would not directly; but it would turn the attention of the public to agriculture, and that would be sufficient. I have no doubt you would soon see model farms established in every State, and agricultural schools in them, the pupils of which laboring on the farm, would carry into practice, one half of the time, instructions in science which they have received the other half.

I believe it is a practice of some, when a new enterprise is proposed, to sit down and count up the costs. Well, the extra duties it would impose on assessors would not probably average more than six or eight days' labor a year. This to each county would not be much. What the extra expenses of the Patent Office would be, I am not able to say; you, of course, would be the best judge. Printing the reports would be considerable. To reduce this item of expense, I would suggest that the public printer—after furnishing a proper number of copies of Reports for the use of the government—should be allowed to furnish subscribers with copies at as low a rate as he could afford. Now, if he had 200,000 or 300,000 subscribers, or half a million, or more, he could afford to furnish copies at a little over the price of the materials and labor, and have a handsome profit besides. The whole cost of an efficient agricultural organization would be very small. The federal government would enact laws to organize an agricultural bureau, and the State government would enact laws adding the above-mentioned duties to the assessors.

If you have time, and think the above suggestions worthy of your attention, be so good as to drop me a line; let me have your opinion in regard to them.

Yours,

R. WATT.

Hon. THOS. EWBANK,
Commissioner of Patents, Washington City, D. C.

NEAR RICHMOND, INDIANA, *January* 1, 1852.

SIR: Through the kindness of my friend, George W. Julian, M. C., I received, some time since, a copy of thy Agricultural Circular, which I laid aside, intending to make a brief reply at some convenient time. I have again opened it this evening; and, notwithstanding the lateness of the hour, I feel inclined to drop a few lines.

Wheat.—Guano is not used in the production of this crop in this vicinity. From 1 to 2 bushels of seed is sown per acre, (usually $1\frac{1}{4}$ bushel.) Time of sowing from the 1st of September to the 15th of October. Early sowing generally preferred.

Wheat has been sown in the months of June and July with moderate success. Harvesting usually commences about the 25th of June, and continues about 2 weeks. We seldom plough our ground more than once. Additional ploughings would generally pay—I think not always. Wheat is made faster with manures; stable manure is the best—for clay

soils particularly. This it is best to spread after the plough, and before the harrow. Wheat, well manured in this way, cannot easily be winter-killed. The yield per acre is various—from 10 to 25 bushels—principally owing to the kind and strength of soil. Wheat has not been more than 50 cents per bushel; when harvested, will average 47 or 48 cents. It is said that sheep penned in a barn infested with weevil will effectually expel them.

Fruit.—The culture of this crop here does not receive as much attention as it deserves. Apples are, or rather would be, a profitable crop, did we have a cash market for them, which we hope soon to have. In a good fruit year we usually sell apples (hand-picked and delivered) at 20 cents (sometimes 25) per bushel; which yields a moderate remuneration. At 25 cents, apples would well pay for cultivation. I prefer budding to grafting, especially on small trees. When the bark peels the freest on a thrifty limb, half an inch, more or less, in diameter, make an incision with a sharp knife crosswise; then split the bark barely to the sap; from this cut downwards an inch or more with the point of the knife, and open the bark a little each side of this slit; from a twig grown since the preceding spring, in which the sap is also flush, cut a bud, with the bark of the twig an inch in length; carefully take out the wood that has been cut with it; slip the bud into the prepared place for it, as above; wrap moderately tight with a woollen thread; in two weeks take off this thread, and the nature of the tree is changed.

If rightly budded, pears and apples seldom fail to "take;" peaches and cherries are much more uncertain. I budded a few cherries the past season in the way described; some of which have grown several inches; one about 2 feet.

Thine, very respectfully,

ROWLAND T. REED.

COMMISSIONER OF PATENTS.

MUNCIE, DELAWARE COUNTY, INDIANA,

November 17, 1851.

SIR: Yours of August, 1851, making inquiry respecting agricultural products of this county, is now before me, and I return you the following:

Wheat.—There is no guano used in the production of crops in this county. The average product of wheat is about 15 bushels per acre. Time of seeding is about the 15th of September; harvesting, from the 1st to the 15th of July; quantity of seed per acre, 1¼ to 1½ bushel. We plough generally, if fallow, twice; if in corn ground, once, and harrow once. The yield is increasing. Rotation is—first corn, then wheat, then clover, and then corn again, &c. No remedy for Hessian flies. Usual price per bushel is 40 cents.

Corn.—The average product is 35 bushels. No experiments have been tried here in feeding. We feed whole; no doubt there is a better way. Oats yield about 25; barley 25; rye 15. Seed used: oats, 2 bushels; barley, 1½; rye, 1¼.

Peas are not cultivated.

Clover and Grasses.—One and a half ton per acre. Stable manure is the only manure used.

Neat Cattle.—Cost of raising till three years old from $10 to $12; price from $12 to $14; good cows are worth from $12 to $15.

Horses.—The growing of horses is profitable. Cost of raising a colt or mule to three years is $40. Brood mares and colts should be tenderly treated and properly cared for; kept in good pastures, and sheltered in stormy weather. Colts should be handled while young.

Hogs.—The best breeds are the Berkshire, Russia, and China.

Potatoes yield from 100 to 150 bushels; the best variety is Meshanock.

The *Culture of fruit* is receiving increased attention. There can be fruit enough raised upon one acre to render it profitable. The experiment for winter use and exportation not fully tried.

Yours, respectfully,

SAML. W. HARLAN.

Hon. THOMAS EWBANK.

COTTAGE HOME, HENRY COUNTY, INDIANA,
January 18, 1851.

SIR: In reply to your Circular, I answer:

Wheat.—The culture of wheat is receiving increased attention, and every year adds to the amount grown. It is either sown among corn, after wheat or oats, or on clover sward. The first frequently yields a good return, and some farmers believe it the surest crop. Wheat in this county is subject to be winter-killed. We have less snow than in the Atlantic States, and it is urged that the unevenness of the ground, and the dead corn stalks, protect the young wheat plants against the winter winds. The second, third, or even the fourth crop, especially in our rich alluvial bottoms, is sometimes better than the preceding ones. This fact has induced some farmers into the very erroneous belief that wheat may follow wheat *ad infinitum*. This error will be corrected and their folly punished by the exhaustion in their soils of the elements of wheat, or, at least, some of its elements. Wheat after clover is the surest crop, and the yield the greatest. The old "naked-fallow" system is generally abandoned. The weevil is unknown here; the Hessian-fly not a frequent visitor. The two formidable enemies of wheat here are the rust and the winter. Early sowing is the best defence against both. "White-chaff bearded" is the principal variety raised. Blue-stem has been tried by some farmers, and highly approved. Mediterranean wheat is not in much repute. Wheat is sown broadcast, two bushels to the acre. The average crop per acre for the last year, 18 bushels; weight, about 61 pounds per measured bushel. Guano is not used for this or any other grain. Time of sowing, from the 1st to the 20th of September. Average price, 50 cents per bushel.

Corn is the great staple of Indiana. Average product per acre, 50 bushels. The cost per bushel varies greatly in different soils; average cost about 10 or 11 cents per bushel. Indian corn is a very hardy plant, and will grow on almost any soil; but its partiality for a rich, warm soil is manifested by its increased yield. Its maximum yield per acre is

scarcely known. Deep ploughing, fertile soil, and good culture will seldom fail to produce 100 bushels to the acre. The kinds raised are the white, chiefly for bread, and a large yellow, for stock. The latter is the most productive, and is thought to be better for stock. For cattle it should be ground and steamed, or boiled. Prepared in this way, it will produce of fat double the amount of the same quantity fed in the ear. Corn is planted here about the first of May, in hills three and a half feet apart; four grains in a hill; ploughed three or four times with the shovel-plough, (the cultivator is sometimes used,) and dressed once with the hoe. Where the ground is mellow, and free from weeds, this last is dispensed with. Thriftless husbandry is the only enemy it has.

Oats are not extensively cultivated. Average yield, 30 bushels to the acre.

Barley and Rye are still less cultivated. Some farmers who have tried the former consider it excellent for horses, and a profitable crop.

Peas and Beans are raised only for table use.

Clover and the Grasses.—Few crops pay better for the labor of the cultivating than clover. The average yield is not far from one and a half ton per acre, but three tons are frequently grown. Clover yields two crops in a year. The last crop is grown chiefly from the seed. It produces from one and a half to two bushels of clear seed to the acre. Price in the market, $5 per bushel. After the second crop it throws up a fine crop of aftermath, which, if turned under by the plough, is highly beneficial to the soil. Timothy is the principal grass grown for hay, and blue grass for pastures. Timothy produces one crop (average about one and a half ton) per year, and a fine aftermath for fall pasture. It stands first among the grasses. The long ears, filled with seed, are extremely nutritive. Cattle, sheep, and especially horses, greatly relish it. Red-top is grown sometimes on wet land, but it is neither so productive nor so nutritive as timothy.

Dairy Husbandry.—Of dairy husbandry I can give little account. Farmers usually keep enough milch cows to make their own milk and butter, and supply the home market. One farmer in the county pays considerable attention to the dairy, and it is said to be profitable; but I am not able to give the figures for it. Average price of butter, 10 cents per pound.

Neat Cattle.—It is generally believed that cattle at three years old may be bought for less than the cost of raising them.

We live too near the prairies, where the pasturage of *commons* is unlimited, to compete successfully with our neighbors of Illinois in raising cattle. Cattle, however, if not satisfied, will live and thrive on coarse feed, such as wheat straw, the winter pickings of the corn-fields, &c. The largest and finest cattle cannot be raised entirely on this kind of food, but still they will winter upon it; and many farmers have herds of forty or fifty wintering around straw ricks. In the coldest weather they give them some grain.

The Durham is thought to be an improvement on our native stock; and if to have large fine cattle be the only object in raising them, there can be no doubt of the fact. But as no accurate experiments have been made to test the matter, I am scarcely able to give an opinion. As opinions, unsupported by actual experiments, are worth nothing, I shall not venture one.

If the prevalent opinion is true, that mere beef-cattle cannot be raised to profit if grain-fed during winter, the excellency of the Durham may be questioned; for—though high feeding may not make Durhams of our common stock—it may be true that hard fare may produce the common stock, or something not superior to it, of the Durham. But time will test this matter. The Durham, it is believed, fats more easily than the native breeds.

Much attention has been paid to the improvement of cattle, and some of the finest animals have been introduced.

Horses.—Horses are in much demand, and raising them is thought profitable. A good horse, six years old, frequently sells for $100. Horses are generally taken to the South; some, however, to the eastern markets.

Sheep-raising is yet in its infancy. Public attention is beginning to be attracted to the subject, and fine-woolled merino command a very high price. Hitherto only wool enough has been raised for domestic use; judging from present indications, a few years will make a great change in this respect.

Hogs are first among our domestic exports. The breeds raised are crosses of several improved varieties with the native stock. The Berkshires, a few years ago, were in high repute; but now fallen—I think without much reason—sadly into disgrace. The hog is a great consumer; and to be raised with profit, should not be fed more than one winter. Pigs littered in the fall should always be brought into market the next fall. Clover, for summer feed, is decidedly the cheapest; corn ground and cooked, as I have already stated, is the best for fattening. When fed in this way, they should be kept in close pens. Hogs are frequently turned at large in the fields of corn, with full privilege of helping *themselves*. This costs less labor; but if it is true, as some experiments have shown, that corn ground and cooked will produce double the amount of fatted pork that corn fed in the ear will—bushel for bushel—then economy is not on the side of this wasteful practice.

Tobacco.—Some attention is beginning to be paid to the culture of tobacco; but I am unable to answer any of the queries in the Circular concerning it.

Hemp is not raised.

Root Crops.—These, as yet, are only raised for table uses. Attention is beginning to be attracted to the subject, and next season will witness several experiments of the culture of roots as a field crop. That they will ultimately constitute a part of our system of rotation of crops, I have no doubt.

Potatoes, (Irish and sweet.)—The first are just recovering from the rot; they have never been raised here for other than table use. Last spring I planted several varieties together; by mid-summer the tops of all, except the long Johns, were destroyed by the blight, though the tubers were not affected. This kind continued to grow until frost, the tubers being large and numerous; while those of the other varieties scarcely paid for gathering.

Ashes and well-rotted manure should be spread over the ground, and the potatoes dropped on top of the ground, rather than in furrows made by the plough. The sweet potato should be planted in hills, or ridges, (hills are better,) two and a half feet across at the base, tapering to one foot at

the top. If in hills, one plant only should be placed in a hill; if in ridges, about the same proportion. The vine should not be allowed to take root. The plant, in this latitude, should be raised in a hot-bed; the sweet potato is a native of the South and loves a sunny exposure. Ashes are a good manure for this root; 200 or 300 bushels may be raised to the acre.

As you will receive a communication from a distinguished orchardist of this county, it is not necessary to answer your queries respecting fruit.

Manures.—Neither guano nor plaster of Paris is known here as a fertilizer. Agriculture is not studied as a science. The laws which govern vegetable reproduction are not as well known as they should be. In this county, as in all others where the soil is rich in the elements of vegetation, no attempt is made to improve the natural fertility. Barnyard manure is almost the only fertilizer known. Even lime and ashes are little used. Our soil is rich in the carbonate of lime; and it is questionable whether an additional portion would prove beneficial. Ashes are a manure on almost all soils; on cold clays they will often double the crop.

Some attention has been paid to draining the land lying between our streams. After we leave the river bluffs, it is inclined to be wet. This land, believed at first to be of inferior quality, is found to be much improved by ditching. One man informed me that the increased products of two years more than compensated him for the expense of ditching.

Deep ploughing is becoming much more common; the effect of which is abundantly evident in the increase of crop.

There is an agricultural society in this county. It was organized this year. It was entered into with zeal by our farmers. The benefits of it will soon be manifested.

Very truly yours,

ISAAC KINLEY.

The COMMISSIONER OF PATENTS.

WASHINGTON, WAYNE COUNTY, INDIANA,
December, 1850.

SIR: Being prevented from replying before to your request, I at this late hour design giving what information is in my reach respecting some of the subjects of your inquiry.

Corn is the principal grain produced in this county. As the soil is exhausted, other grains and clover are substituted. When the land is first cleared of timber, it will produce 60 or 70 bushels per acre; but by continued corn-growing from year to year, in the course of 12 or 15 crops, 30 to 35 bushels are all that can be produced. More white corn is raised than yellow; though the yellow will yield most per acre, and is considered most nutritious. In all lands cultivated in corn, 40 bushels are an average crop per acre; yet, by proper rotation with wheat and clover, 75 bushels might as easily be produced on the same ground.

Cost of production, 15 cents per bushel; price this season, 30 cents. Average price for last four years, 20 cents per bushel. But few experi-

ments have been made on ground or solid corn; the price being too low, for both corn and pork, to induce many to economize their grain. It is common to turn hogs into a field of corn and give no further care to them than to salt and water them until the corn is consumed; then turn into another field. Fields thus managed will produce good corn from year to year, without change of crop.

Wheat is now a staple crop. Perhaps half as much wheat as corn is raised in this region. The greatest enemy to the wheat crop is *rust;* to prevent which, the earliest varieties are selected, and sown as early as the 1st of September. The best varieties for this purpose are the rock, which is a smooth head, and red-chaff, and the white-chaff bearded. Rust seems to *strike* all wheat about the same time in the same vicinity; after which, the berry, in whatever state of maturity it may be, begins to dry up; so that late wheat is often left in the field unharvested. Ordinary time of harvesting is from the 1st to the 10th of July.

More wheat is sown among corn than in all other modes of sowing; when it produces 12 bushels per acre. But if, when fallow or clover ground is ploughed in June or July, then ploughed again in September, you sow the wheat and harrow well, 20 bushels per acre are produced. Three and four crops of wheat have been raised in succession, and the last was better than the first. Five pecks are sown per acre. Some experiments this season in deep ploughing more than doubly repay the labor, both for corn and wheat. As attention is paid to better modes of preparing ground, the crop is increasing. Price, 60 cents per bushel.

Oats are not very extensively cultivated, and are not considered a profitable crop, as they are thought to exhaust the ground more than wheat. Seed sown per acre, 1½ bushel; price per bushel this season, 25 cents.

Clover is begining to be much cultivated for the purpose of resting and enriching the soil. It is principally pastured by hogs and cattle; seldom being cut for hay.

When the early part of the season is wet, I have known three tons of clover hay to be mown per acre. As the time for cutting clover comes in the most busy season for working corn, and as that time is generally liable to frequent rains, which are much more injurious to clover hay than other grasses, it is not commonly mown for hay.

Timothy is commonly used for hay, and yields, on an average, 1½ ton per acre. It is not a profitable crop to raise for market; the price generally averaging $5 per ton. This season, however, owing to drought last summer, the price is $8. Too little attention has been paid to this branch of husbandry to know much about the effect of manure or flooding meadow lands.

Hogs.—Until recently, owing to the distance to market, hogs were the principal means of obtaining wealth, as they could better be driven 80 miles to market than to haul grain the same distance. Hogs are generally sold at the age of from 18 to 24 months. They are not generally fed, but eat what they can get until the last four months of their lives, when they are made fat by feeding them with what corn they will eat in the ear. They are generally pastured on clover in the summer, and fed on grain. In the winter they are fed enough corn to keep them in what is called "growing order." I am satisfied that more pork, with less expense, can be produced by keeping pigs fat from their birth, until they are slaughtered. A pig, kept fat until it is 12 months old, is larger and better for

pork than one 20 months old kept three-fourths of the time in only "growing order." The average weight of hogs in market is 200 pounds net.

Irish Potatoes are considerably cultivated. Owing to the potato rot during the last four years, comparatively few have been raised. The variety most cultivated, until recently, seems to be much more liable to the rot than other kinds—that is, the Mashanocks. To avoid the rot, we select the kinds of potatoes least liable, and then plant on a gravelly or sandy hill-side as early as the potatoes will vegetate—say the 1st of April. They flourish best on new soil, or that which has been highly manured with stable-manure. Price this season, 60 cents per bushel; average yield per acre, 150 bushels.

Sweet Potatoes grow well here of a dry season, planted in a sandy soil; best manure, ashes; price this season, 65 cents per bushel.

Apples.—The only fruit profitably cultivated; they are abundantly grown for cider, and family use. No experiments have been made as to their adaptation to feeding stock. The best winter varieties in use are the Rambo, bellflower, greening, golden russet, white winter pippin, Newtown pippin, never-fail, and wine-sop.

Pears are a very uncertain crop, as the trees seldom live more than 10 or 12 years.

Peaches have been an entire failure the last 10 years, owing to the yellows and the severity of the winter. Perhaps, however, the winter would not injure them were not their vitality first affected by the yellows.

W. W. BUNNELL.

Hon. Thomas Ewbank,
Commissioner of Patents.

Richmond, Wayne County, Indiana,
8th month, 25th, 1851.

Sir: Thy Circular reached me a few days since; in answer to which I may say, no lime, guano, or plaster has been used on our field-crops, excepting some few cases, which have not been so successful as to justify the expense; nor have I seen any benefit from their application to our vegetable gardens, unless it is to frighten the potato-bugs from the plants. I have been much diverted at seeing the haste with which they will leave the premises after having their heads well powdered with lime, &c.

My *Rotation of Crops* differs from most of the farmers in this settlement. I put all the green manure I can get upon my sod-ground in early spring, and, as soon as spread, I turn it under from 8 to 10 inches deep; then harrow it well, and plant the corn from 3½ to 4 feet apart each way, with 4 grains to a hill; cover it 2½ to 3 inches deep with light soil. My reason for this deep planting is, that the cut-worm does not go so deep in the soil as to reach the heart of the corn, and then cutting it above the bud does very little injury. Let the farmer try it, and I think he will not go back to a half, or an inch deep. As soon as it is 2 or 3 inches high, we commence with the cultivator 2 or 3 times in a row both ways, and continue on until near wheat harvest—say 6 times each way—when we lay it by; and as soon as the grain is glazed, I begin to cut the corn close to

the ground, putting 32 hills to a shock. (Now, it is to be understood that there are no weeds or grass in the field.) We then go 2 or 3 times in each row both ways; then sow about 1½ bushel wheat to the acre, and, with a large harrow, 12-inch iron tooth, we go over the whole field, levelling the ground. Immediately after this, I sow 1 bushel timothy seed to 8 acres; and, in the 3d month, (March,) I sow a half bushel clover seed on the same ground. I pasture it the next year, and the following two years mow for hay, then green manure, &c., as before. My reasons for this course of cropping are drawn from observation, and some little experience. I have noticed, when the juices of the barn-yard run through my corn-field, that the corn could hardly be better; and when they pass through any part of my wheat-field, it would be perfectly worthless; hence I concluded the green manure was just what the corn wanted, and that portion of the manure the corn did not take up was precisely what the wheat required; and by following these notions, I have seldom raised less than 50 to 70 bushels of corn, 20 to 28 bushels of wheat, and, fair seasons, 2 tons of hay per acre. Now, I can give no chemical reasons for my whys or wherefores; but more of this by-and-by.

I try to get my wheat in the ground not later than the middle of the 9th month, (September;) and I am careful to try not to sow one seed of cheat, for I know it will grow; and I would as soon believe that Indian corn would turn to broomsedge, as to believe a clean grain of wheat would grow chess. Why not turn to fox-tail, blue grass, or any other kindred grasses? The thing is incompatible, and should be frowned at by every practical farmer. But to return: My reason for sowing wheat early is to avoid the rust; and I often found it so well ripened before the fogs and hot suns fell on it, that it sustained no injury. I also try to cut my wheat as soon as the milk will not press out of the grain; it shatters less, and the wheat is just as good. Our oats are sown on our poorest corn-ground in the 3d or 4th month, (March or April.) Perhaps it would not be apart from the subject to say, our corn, wheat, oats, and hay were never better, in quality or quantity, in this settlement.

Butter and Cheese.—Very little attention is paid to butter and cheese over the wants of the settlement.

Horses and Mules are raised with us, though but few of the latter. Of the horse we have raised some very fine, at a cost not under $50 at 3 years old. Very little attention is paid to *sheep*, and less to improved varieties.

Hogs and Corn are our staples. We try to slop them twice a day, and give them an ear of corn each at slopping-time. By this course we get them to weigh 250 to 300 pounds at killing-time, which is generally about the close of the year. The Berkshire, when they will be from 18 to 20 months old, crossed with the Irish grazier, is preferred by most of us. Root crops are not raised for distant markets. The little surplus finds a low market in our city.

I now take up the subject of my ignorance (referred to on the other page) as regards the proper application of things to things in farming. If I understood the drift Congress had in gathering all practical facts, it was that they might be embodied in a permanent form *for the good of all;* and if this had been done, perhaps I might have been much better qualified to give good reasons for my course of farming. I believe if the Reports of the Commissioner could reach the farmers and mechanics, as

they justly should, they would be considered a treasure to us; but what are the facts of the case? Do not the members of Congress, * * * * * * * * except a few hundreds put into the hands of the Commissioner—first tying his hands before he shall distribute them, sweep off the whole lot? These books, with other like things, are taken to their respective homes by cart-loads, and there distributed among just such men as themselves—lawyers, doctors, &c.; some of whom, I venture to think, if I were ploughing, and wanted my plough to run a little deeper, and were to ask their advice, would be as ignorant as a child to advise me. Many such men as these get the books, and these men may consider themselves the public; but the facts are, the public do not get them—the farmers and mechanics, who are the largest portion of the community, do not get them, though they need them most.

I have inquired of many for the late Report of the Commissioner, and none have so much as seen it. It is true, I had the privilege of looking into one about five minutes, and this was in the hands of a doctor; and I have my doubts whether he has seen the inside of it for three months past. Not a farmer or mechanic of my acquaintance has this book, that I can find. My word for it, the thing is wrong as regards its distribution.

I remember, not long ago, I asked the present Commissioner to continue to me the favors I received from his predecessor (Ellsworth) in sending me a copy of his Reports; and he was kind enough to send me the law governing him in the distribution, by which I found he had no right to do so unless contributions to the Agricultural Bureau were first made. Now, was it not known by the makers of this law that not one in fifty of those who would delight in reading the book could scrape up and put together his ideas, of the adaptation of thing to thing, of manures to soils, of effects and their causes, such as would make a paragraph in one of his Reports? and knowing this, to require of us to do that which we have no capacity to do, is verily too much like Pharaoh requiring of the Israelites the full tale of brick, without furnishing the means to make them. Give us the books; they are the property of the farmers and mechanics, in common with others, by a fair construction of the law; and justice should be done them. I do not blame the Commissioner. I think he stands excused by law; but the law does not make it right that his hands should be tied thus. I think he should have ten times the present number of copies placed in his hands; and such as would ask for them should have them; and then I have little doubt but in time that Bureau would become one of the richest treasuries of practical agricultural facts on the face of the earth; but keep them out of the hands of those who hunt more for the loaves and fishes than the good of the whole community. Could some of you only feel a little of that pleasure we would have, whilst our horses were feeding, to sit facing a pleasant breeze at our windows, and reach from the table and read some of the reports touching some of the branches of farming that we had just been engaged in, I think more liberality would be extended to us. I say, again, give us the books—the key—that we may, with industry on our part, unlock to our understanding some of the laws—the wondrous laws—of the God of Nature.

Very sincerely, I am thy friend,

JOSEPH P. PLUMMER.

CEDAR FARM, HANOVER COUNTY, INDIANA,
December 25, 1851.

SIR: Having just received a copy of the Patent Office Report of 1850–'51, in compliance with a promise contained in your Circular, I make haste to lay you under a similar obligation for the next year. In my former communication I was silent on the subject of your inquiries, save hay and fruit, which had received most of my attention up to that time. During the past season my crop has been of a more general character, and therefore I shall endeavor to extend my communication, by stating the result of my experience and observation on some others of the many crops raised in my neighborhood.

Wheat is produced here at an average of from 10 to 15 bushels per acre, and is considered a very uncertain crop, on account of the prevalence of the rust, weevil, &c. It is badly farmed—in most cases being sown on corn land, or on oat stubble, after a shallow ploughing, and receiving but a partial harrowing, and frequently sown as late as the months of October and November; all of which render the crop more liable to the attacks of rust. There are, however, exceptions to this system of wheat culture—such as sowing on a clover-lay, deeply turned under, or early summer-ploughing, and stirring before sowing; and, in a few cases, the grain-drill is used: almost all of which increase the yield from 25 to 50 per cent.

The Mediterranean wheat is mostly sown in my neighborhood, being considered less liable to disease than other varieties. It has been grown here for the last ten years, and has uniformly produced a remunerating crop when sown early, if there is moisture enough in the land for the seed to vegetate, which, however, has not been the case this season and last; both of which were too dry for successful sowing in the month of September. The consequence is, our present crop is scarcely more than up above the clods at this time. This was the case, to some extent, last year; but the favorable weather in May and June matured a crop of good quality, and in most cases we had a fair yield.

I received a small package of white wheat from the Patent Office, which I sowed in drill, and manured; but it was too late for it to vegetate before winter set in. I hope it will be up in the spring, and may prove a good variety. Should it fail to come up, I shall apply for more from the same source. I received a few grains sent me by a friend from the shores of the Mediterranean; it was sown late last fall, and from the produce I selected what appeared to be five varieties in color, all of which will be distributed if thought to be valuable varieties. The same friend has promised to send me a cask of seed wheat from the Black sea, of the best grown there; also, the best seed oats to be found in Europe; all of which will be forwarded to the Patent Office—if found to be of superior quality—for distribution.

The reaping machine is coming into use here, giving general satisfaction where used. I used one this season made by * * * * * * and can say that it is a most valuable labor-saving as well as grain-saving machine. It does the work of six cradlers, requiring only two hands and four horses to manage it, laying the grain in wide grips or bunches behind the machine, evenly and without waste, requiring six binders and two men to gather and shock the grain as fast as it is cut. It also saves lodged or leaning grain better than it can be

done by hand, and is equally adapted to the cutting of oats, barley, timothy seed, &c. I have also a mowing-machine, which does equally well—doing the work of nine scythes. I have also a patent improved eight tooth drill, which works like a charm on properly prepared soil, drilling the wheat or other small grain so regularly in rows that they may be distinctly seen across a square of five or six acres. There is no questioning the advantage arising from the use of the drill in the wheat crop, as the plant is left to stand in a shallow furrow, being less liable to freeze out.

The average price of wheat at our nearest markets is 75 cents.

The *Oat Crop* here yields an average of about 25 bushels per acre. Price 20 cents per bushel.

Potatoes are grown to a considerable extent near the navigable streams, for the New Orleans market. Most productive planted in drills 2½ feet apart, and set six inches apart in the drill. Small and cut seed as good as any; proved so beyond dispute. Produce, in good natural soil, of fair seasons, 200 bushels per acre; twice that amount in a few instances. Mercers most saleable, but considered more liable to disease. Price $1 per barrel, of 2 to 2½ bushels each.

Corn is the crop most cultivated; but a system of injudicious farming has reduced the yield from 60 and 70 to 30 and 40 bushels per acre on upland.

But experience has shown that soil, thus impoverished, may soon be restored to its original fertility, either by manuring or ploughing in crops, such as oats, corn, and buckwheat, sown broadcast and turned under; when sufficiently grown, to call into requisition the turning capacities of a good two-horse plough, such as are made by * * * Pittsburg, of cast iron. These I have found to be the best in use.

I have this fall harvested a crop of *corn* from a field which was cultivated in corn last year, producing, from ordinary cultivation, about 50 bushels per acre. This season, from the use of a subsoil plough, procured from * * * * * * New York, I have raised, without the use of any fertilizing matter, on the same field, at least 75 bushels per acre; the season being not better than the last. My method of culture was this: I first broke the ground with a heavy plough, drawn by two yoke of oxen, following immediately in the furrows with a subsoil, thus breaking the land to the depth of from 12 to 14 inches. The crop was then planted in shallow furrows, 4 feet apart each way, and from 3 to 4 plants in a hill. Yellow gourd seed, ploughed first time with a subsoil plough, drawn by two horses, one on each side of the row, running close to the young plants. The cultivator was then passed through both ways, to clear out the middles. In about 10 days a wing-plough was passed through one way, going twice in a row, and throwing the dirt to the corn; in a few days the cultivator was used both ways again, as a finishing stroke to the crop, leaving the ground level and in fine order for timothy, which was sown in the month of August, the corn being a protection from the hot sun. This experiment has fully convinced me of the importance of deep tillage, as one means of good crops, and security against injury in wet and dry seasons.

Fruit.—Having noticed the crops mostly grown in my neighborhood, I would say, on the subject of fruit, I have nothing new. This was a

fruitless year in this part of the West, and what apples we see in market are of New York growth. Good, however, may result from this, as many varieties, new to the West, will be brought into notice, some of which may be adapted to our soil and climate.

The peach tree is grown here with ordinary success; but the fruit, for some years past, has rotted more or less. Elevated locations are said to be more secure from this disease. Much finer varieties than formerly are now grown by process of inoculation.

The small fruits and berries flourish here, among which I have found the red Antwerp raspberries the most remunerating upon the labor bestowed.

Grape.—The grape grows the vine well, nor does it freeze in winter; but of late years the fruit is attacked by a rot just before maturing, and not unfrequently a fine prospect will fall a prey to this disease in a few days. This disease seems to be produced by hot, showery weather, which, of late years, frequently occurs at the time fruit is maturing.

Horses, Cattle, and Sheep are only raised in southern Indiana for domestic use.

Pork is only produced for domestic purposes. In the counties bordering on the Ohio river it is made from the native breeds, in the ordinary way, by feeding corn in the ear; and, as a consequence, the hogs are not regularly fed while young, and are of small size when slaughtered, compared with those raised upon slops, in pens.

In reading the Patent Office Report, I have seen much complaint of the ravages of bug, fly, and skipper in meat, in some latitudes. Having myself been a sufferer in this respect, I will embrace this opportunity of publishing a recipe given me by a Mississippi farmer, who had formerly resided in Virginia. His farm was located in the corn-growing district of Mississippi, and he grew pork for the market, as well as corn. I inquired of him whether he was annoyed more or less by these pests to bacon than we of the northern and middle States. He informed me that they were more numerous there than farther north, but a farmer who put up his bacon right need have no fears from those insects. He then, at my request, gave a detailed account of his mode of curing bacon, which was as follows:

After the bacon was sufficiently smoked, at a season in the spring before the fly made its appearance, he coated the cut-side of ham, shoulder, or middling with wood ashes, packing it on with the hand one-eighth, one-quarter, or one-half an inch in thickness, as might be most convenient, being sure to have the cut-surface entirely covered, taking care to cover the hams thickest where the bone comes to the surface, on the thick part of the ham.

Scaffolds are to be made in the upper part of a rat-proof smoke-house, of poles or sticks, at a suitable distance to allow the ashed bacons being placed on them in rows, taking care that the pieces of meat do not touch, carefully examining each piece after it is laid down, to see if the ashes have fallen off, which, if so, must be replaced. After your bacon is thus placed on scaffolds, or shelves, one above another, it is in a position for occasional smoking, if thought necessary, and free from heating or moulding, which is not the case when packed away in barrels, in salt, charcoa., and other materials thought suitable; and if you have done your part in carefully covering the surface of the cut-part of the bacon with

ashes, I would be willing to pay a dime apiece for all the skippers found in your meat for the space of one, two, or more years. This remedy I have tried for years, and feel unwilling to try any other, knowing this to be effectual; whilst all other remedies have been, to my mind and experience, objectionable.

Manure.—I am sorry to say we are very deficient in theory and practice. Our winters being mild, the housing of cattle is but little practised, and but little stable manure is made, and that so exposed to the weather as to be robbed of half of its fertilizing matter. Plaster of Paris, as far as tried, has not proved of much benefit; nor is it to be had in the West, only as shipped from the eastern States.

Peruvian guano has not been experimented upon here yet, not being within our reach. A manure of this quality, possessing great merit in small bulk, would be well suited to the capacities of the West, as it would require but little labor to put it on the crop; the labor being a great item where it is as scarce as it is here.

I remain, most respectfully, yours, &c.,

JACOB L. KINTRED.

Hon. THOS. EWBANK,
Commissioner of Patents.

ILLINOIS.

PLAINFIELD, WILL COUNTY, ILLINOIS,
January 4, 1852.

SIR: I acknowledge the receipt of your Circular of August, asking for information respecting the different branches of agriculture; in answer to which I respectfully submit the following:

Wheat.—The prairies, when new, produce wheat of a good quality, and an average crop of about twenty bushels per acre. But as the land becomes older, though it continues to produce a heavy growth of straw, the grain is gradually diminishing, both in quality and quantity, until it does not produce, on an average, more than ten bushels per acre. The light crops generally produced, added to the numerous total failures, render wheat-growing a very hazardous business.

The only preparation seed receives is a thorough cleaning in a fanning-mill.

The usual time of seeding is from the 15th of August to the 20th of September. I am satisfied that from the 20th to the last of August is the proper time for seeding. It will then be ready for the reaper about the 10th of July, and is much safer from rust than that which ripens later; also, when late sown, the plant makes but a feeble growth in the autumn; consequently, it is more liable to injury from the winter; and when the scorching rays of the sun in June and July are poured upon it, it must ripen—and that, too, prematurely. The consequence is a light, inferior quality. Still, if seeding is done in proper time, it is very liable to be destroyed by the freezing and thawing, with the drying winds that prevail during the later part of winter and early part of spring, unprotected, as it often is, by snow.

The circumstance of new land producing good wheat a few years, alternated with corn, together with the consideration of the corn-stalks, as a protection during the winter by retaining the snow, has led to the adoption of this plan as the general rotation.

The general results of the wheat crop may be set down as follows:

Interest on one acre	$1 00
Seed, 1½ bushel, 75 cents	1 13
Putting in seed	37
Cutting stalks	06
Harvesting	1 60
Threshing	75
	4 91

Average crop 12 bushels.
Average price 70 cents—70 × 12 = $8 40.

Expense of producing one acre	$4 91
Value of crop	8 40
Net profit	3 49

If wheat is made to follow oats, 75 cents more must be allowed for ploughing, which will leave a profit of $2 74.

The recent numerous failures in the wheat crop have caused a general inquiry after some other system, that shall prove less hazardous.

I will suggest the following rotation, which succeeds better than the general plan, though it is acknowledged to be very imperfect. I will suppose the land to have been cultivated to grain five or six years or more; the rotation is then commenced by seeding to clover; the following June, so soon as it is in full bloom, a crop of hay of about two tons may be taken off. In the fall it will give a crop of seed of about three bushels per acre. If the land has not been too much exhausted by grain-growing, a crop of hay may be taken off the following June; but if that has been the case, it will be better to turn the entire crop under, the first of August, to the depth of six inches. The surface should then be finely pulverized to the depth of three inches and drilled to wheat the latter part of August. In February or March one-eighth of a bushel of clover seed should be drilled per acre. The clover will afford a partial protection to the wheat plants from the scorching rays of the sun during the period of its ripening, and also prevent the growth of noxious weeds, and afford a growth of fall feed, which will again be returned to the soil as a manure.

The wheat crop may be set down as follows:

Interest on one acre	$1 00
Expense of cultivation and threshing	7 00
Average crop, twenty bushels; worth	15 00
Net profit	7 00

In October or November following the wheat harvest, the ground should be ploughed *ten inches deep*. In the spring it should receive a top-dressing of manure. The surface should then be *finely pulverized* by

the use of cultivators, which should be immediately followed by the *drill*, with corn from the 1st to the 10th of May.

As soon as it is up sufficiently, the cultivator should pass through twice between each row every week until the ears begin to set. A man should go through once with a hoe, at an expense of about one dollar per acre, to take out the weaker of the surplus stalks and the weeds that are left by the cultivator.

Interest on one acre	$1 00
Ploughing ten inches	1 75
Manure	5 00
Spring culture	25
Seed and drilling	38
Culture of crop	2 00
Husking and shelling	3 00
Total expense	13 38

Average crop, 75 bushels; value, per bushel, 40 cents; value of fodder, 75 cents; total value, $30 75; net profit, $16 37.

In August, wheat may be sown among the corn at an expense of $6.

Average crop, with the above culture, 20 bushels; price, per bushel, 75 cents; value of straw, $1; value of crop, per acre, $16; profits, per acre, $10.

In October or November, after the wheat comes off, the ground should be ploughed not less than six inches deep; and in the spring, so soon as the ground is sufficiently dry, *drilled* to barley and timothy seed.

Cost of barley crop, per acre, $7 45; average crop, 40 bushels; price, 40 cents; value of straw, $1 25; value of crop, per acre, $17 25; profits, per acre, $9 80.

The timothy may be cut for seed two years, with about the following results:

Interest on one acre	$1 00
Seed, one-fourth bushel	50
Drilling	25
Harvesting and threshing	3 50
Expense of crop	5 25

Average crop, 5 bushels; price, $1 75; value of straw, $2; value of whole crop, $10 75; profits, per acre, $5 50.

Respectfully, &c.,

LORING HERRICK.

The Commissioner of Patents.

Athens, Menard County, Illinois,
December 29, 1851.

Sir: The following observations on a few of the subjects embraced in your Agricultural Circular are respectfully submitted for your consideration:

Wheat.—Varieties chiefly used: red-chaff and Mediterranean. The former, a bearded variety, has been a universal favorite, but has become less productive, and of inferior quality. The Mediterranean has received the go-by. Millers regard it as little superior to rye. Its flouring qualities are inferior to any cultivated. It ripens six to ten days earlier than any other kind, and consequently affords facilities in a large harvest. Several varieties have been recently introduced, which promise to exceed either of the above, in quality at least. Harvest, from June 28 to July 10; quantity per acre, from 10 to 40 bushels; average, 20 bushels. The fly has recently made its appearance, and seriously injured several crops. Remedy, late sowing, from 1st to 15th of October. From rust the loss is light with winter varieties. The spring varieties are generally more or less affected—frequently to the loss of the crop; which, however, is not much relied on here. The greatest drawback on this interest of the agriculturist is the severity of our winters. The whole country is sometimes cleaned out by this cause, which may be effected either by a dry freeze, with bare ground, or with much wet and freezing. It is "spewed out," as it is called. For the latter, ridging up is advantageous; for the former, no effectual remedy. No preparation of seed except thorough cleaning, which is accomplished in no better manner than by winnowing through a heavy northwester. Average price per bushel, at nearest market, (1851,) 60 cents. Not profitable.

Corn.—This is emphatically our crop. We rely upon it for our profits, not to sell, but to feed to stock—cattle and hogs. Varieties in use, white gourd-seed and common yellow, both large. The average yield, per acre, is 50 bushels, with ordinary tillage; though this amount can be doubled by manure and high culture. Cost of raising, per bushel, 6 to 15 cents. It is cut and shocked in the field, and hauled out when wanted for use, and fed to cattle whole and on the stalk. The waste and droppings are used for hogs, saving all; fed whole and raw to every species of stock. This is the cheapest and most profitable plan, in consequence of the scarcity of mills.

Clover and Grasses.—Red clover and timothy are the only species that are esteemed for meadow. White clover is regarded as a pest. The herdsgrass of Pennsylvania, or red-top, has been introduced, but is not valuable; yield, too light. A species of *Poa*, called blue-grass—not the *Poa campressa* of the East—is an invaluable pasture-grass, furnishing food for stock, if the season be favorable, until January, and even later. It spreads rapidly from running root stocks, and is tenacious of life, as every prairie-farmer has sad experience of in his fields. It grows early in spring, and furnishes the first as well as last pasture-grass. Quantity of hay per acre, from 1 to 3 tons; cost of growing, from $2 to $5. It is stacked in the meadow, in and on pens, in which the animals are pastured; and, having free access to the stacks, they help themselves, or it is thrown to them when not so convenient. Timothy and clover are grown together.

Sheep and Wool.—No interest of the farmer pays so well as that of wool. The few who have engaged in the business extensively, realize the largest profits. Every farmer, however, has a flock, principally to afford wool for home consumption; any surplus is sold in the nearest markets, but is thought not to pay well in this way. With the aid of blue-grass pasture, the cost of keeping is trifling; will not average an-

nually more than 50 cents per head. The cost of raising the different qualities is not ascertained; probably from 8 to 25 cents per pound. Large sheep, if healthy, most profitable.

Hogs.—We have a variety of crosses of almost every kind. The cheapest method is to fatten at one year old; when, if well kept, they will weigh from 250 to 300 pounds. Winter them on the offal of the farm; pasture on old clover in summer; feed corn on the cob to fatten. Sixteen bushels, fed with this treatment, will make 300 pounds of pork.

Irish Potatoes.—The most common kinds in cultivation are the Meshannocks, pink-eyes, and Irish grays. The yield has greatly diminished since the malady. Localities not affected with the rot, yet seem to be under the general disease; the vines grow small and die early. I have not seen a matured ball of seed for two years, though I have examined my whole crop for the purpose; the tubers are fewer and smaller than formerly, and probably unhealthy. The average yield per acre is now less than 100 bushels; the cost of raising and harvesting, 15 to 30 cents per bushel. I never lost any with the rot until the present year, and now only a few grown on the north side of a row of peach trees, and a small quantity in a highly manured spot. The shade of the trees on the former was dense, and kept the ground wet. It was thoroughly saturated and heavy (it being a clay) when I harvested them, though the adjoining ground was remarkably dry. They were then principally rotten, and were still rotting. The crop was affected in no other part but in the above-mentioned places; and in this case, at least, I believe the direct cause of the rot was the shade and manure. I also planted a few tubers in the garden which I raised from the seed the previous year, and highly manured them with thoroughly-rotted stable manure. The result was, that the yield was heavy, but badly rotted; nearly every tuber being affected, and satisfying me that no remedy is to be looked for in the seeds of the ball, if it could be obtained; which I believe to be doubtful at this stage of the disease. The best plan of cultivation is to plant early and cultivate thoroughly until the tops fall; never touch them afterwards; and, to avoid the worst effects of the rot, let the soil be dry and light. If autumnal rains be abundant, dig early, thoroughly dry in the sun, and secure from the atmosphere. Use no manure.

Sweet Potatoes.—This invaluable and palatable esculent offers, in my opinion, no barrier to its introduction and succcessful culture throughout the greater portion of the Union. I doubt not but that it can be matured sufficiently to be a profitable crop anywhere that the common varieties of Indian corn will ripen. The yield here is from 200 to 400 bushels per acre. Cost of raising and harvesting, per bushel, 15 to 30 cents. It will furnish an excellent substitute for the Irish potato at least four months in the year; and doubtless methods will be discovered, when once their importance becomes appreciated, of preserving them much longer. It is a tender root, truly, and requires great care in preserving for seed. This is the great obstacle preventing it from becoming more generally cultivated in the northern States; and we confess this is our difficulty. It is a great deal easier to raise them than to keep them. They require to be kept warm and dry; that is the secret. A degree of cold considerably above freezing will soon destroy them; and I doubt if a degree of warmth, independent of artificial heat, can be provided for them that

will preserve them through our long, cold winters, where the mercury frequently abates to 11° below zero. But every farmer who has a chimney that he uses through the whole winter, can, with from $3 to $5 additional cost in its construction, keep them safely in any latitude where they can be raised, by building a double wall around its basement, filling between them with dry stable-manure, saw-dust, or any good non-conductor, and placing his potatoes, with dry sand or dust, within, having the apartment not exceeding 15 inches wide, and covering with dry saw-dust or any other non-conducting substance, and securing from moisture above by covering the whole, and from beneath by raising up, if necessary. There will be warmth sufficient conveyed to them through jambs and back to preserve them, if they are sufficiently secured from the cold without. I have succeeded in keeping them here, latitude 40°, in this manner for many winters, with a small proportion of loss. As soon as the silver leaf, *Hepatica triloba*, is in bloom, take them up and sprout them in a hot bed; this must be done here and northward, and is advantageous further south. The best plan of cultivation: plough the land at least twice before planting; if thin, manure lightly; but this must be done with care, for there is danger of growing them all to strings and vines; a sandy loam lying southward is best without any manure; throw the land in ridges three and a half feet apart, with the *plough;* let them be east and west, if practicable; but, as of first importance, arrange them so that the furrows between them will immediately carry off the surplus water. Nothing can be more detrimental to this crop than continued wet. Finish the ridges with the hoe, and plant the sprouts 18 inches apart. This is as near as they ought to be set to yield large tubers, though the quantity can be doubled by planting them one-third that distance. If the weather is dry, half a pint of water will be necessary to each plant; otherwise, nothing is required but careful setting. When weeds appear on the surface, trim the ridges down with a hoe, plough between, and again hill them up before the vines spread so much as to obstruct the work. This is all the cultivation necessary, provided the ground be not very foul, when more labor will be required to keep the weeds subdued. Yams have been recently introduced; they are prolific, but are thought to be inferior in quality to the common red. This requires, however, to be further tested.

Fruit.—The cultivation of fruit is receiving increased attention; many get more profit from their orchards than from all their farm besides. Poorer varieties of seedlings are being replaced by superior seeded and grafted varieties. I know no remedy for the pear and apple tree blight, and fear I never shall; heavy losses this year. The yellows on peach-trees are rare; know no remedy.

Manures.—None are used for the field, except stable-manure, which is hauled indiscriminately on the land most convenient, when it becomes necessary to remove it from the stable. Mother earth is left to her own resources, in which she is rich.

Yours, truly,

ELIHU HALL.

Hon. THOS. EWBANK,
Commissioner of Patents.

ARENZVILLE, CASS COUNTY, ILLINOIS,
September 24, 1851.

SIR: In reply to the Circular issued from the United States Patent Office, the following statements may be taken as generally correct for this and the adjoining counties, south of the Illinois river:

Corn is first in order as a staple article; a good average yield is 50 bushels per acre. Cultivated land is worth from $10 to $20 per acre; and farm laborers receive from $12 to $15 per month. Seed, ploughing, planting, and harvesting corn, are worth $5 per acre. The average price for corn in ears, during this season, has been 20 cents per bushel at the farm; yielding a profit of $5 per acre. Three-fourths of the corn raised is consumed in feeding hogs and cattle.

Hogs.—Beardstown, in this county, is the best market for pork on the Illinois river. The hogs killed last winter numbered 36,000, averaging two hundred weight, at a price of from $3 to $3 50 per hundred weight. A pig, having the advantage of timber and prairie for range, will require 10 bushels of corn till the age of 18 months, and 15 bushels to fatten, and then weigh two hundred weight. Feeding steers has been more profitable than hogs, but requires more capital.

Wheat averaged about 20 bushels per acre; worth at the farm 50 cents per bushel. The season was unusually wet, and much grain damaged. The cost of seed, planting, harvesting, and threshing wheat, exceeds that of corn, and is less remunerating to the farmer.

Oats and Grasses yield large crops; timothy and clover, mixed, readily produce 2 tons per acre; worth from $5 to $6 per ton.

Irish Potatoes.—There will not be more than half a crop of Irish potatoes, owing to the rot, with the exception of a few small localities.

Fruit.—There was an entire failure of fruit, caused by late frosts in the spring. The blight on apple and pear-trees, which made its appearance two years ago, has been on the increase this season.

Grapes rotted mostly before maturing, except on young vines. The only mode to succeed in raising grapes here is to have young vines; the rot on the berry makes its appearance about the third year of bearing, and increases with age, as far as my observation enables me to judge. The cause of blight on fruit-trees, as well as the potato rot, is not known, and all the alleged causes are mere matter of speculation.

With great respect, yours, respectfully,

FR. ARENZ.

Hon. THOMAS EWBANK,
Commissioner of Patents.

ADAMS COUNTY, ILLINOIS.

SIR: Your Circular, calling for information on agricultural statistics, came to hand in due time, and for this act of courtesy you have my sincere and heartfelt thanks.

Wheat.—The farmers of Illinois must, sooner or later, abandon wheat-growing as the principal crop; the outlays are so enormously expensive. Three hundred dollars for a threshing machine, $125 for a reaper, and $100 for a seed drill, are quite too much to be invested in a wheat crop to

commence with; and to this may be added its liability to winter-kill, in light, loamy soil, and the fluctuations in the market. The wheat crop is a decided failure in this section this year, owing mainly to winter frosts and heavy summer rains. The product annually is from 15 to 25 bushels per acre. This year it is reversed, and comes nearer 10 or 15 acres to the bushel.

Corn.—Our corn crop this year is very light on our large flat prairies. The season was so remarkably wet that many farmers never put a plough or a hoe into their fields after planting. The question to be decided is not how many bushels per acre, but how many acres it will take to make a bushel? The best method of feeding is to turn the cattle into the corn fields; and, if no snow, they may live until Christmas.

Grasses.—Our best crops for wet seasons are the cultivated grasses; and for common use, or for marketing, what is called, in the eastern States, herdsgrass or timothy stands first in order; for pasture for milch cows, common red clover is preferable. The quantity of seed used per acre is one bushel of timothy for five acres, or one of clover to ten acres. A good meadow of timothy, in common seasons, will yield a ton and a half to two tons per acre; worth, in the stack, $5 per ton. The best fertilizer for our meadows is a coating of barn-yard manure, which will often make it yield double the quantity of hay for from 4 to 6 years afterwards. There is no question to my mind but that the cultivation of hay or stock-raising is the most profitable business which can be engaged in for years to come in the West, where the farmer has a good range for stock. After a meadow is well down to grass, the cost of cutting and stacking cannot exceed $2 per acre; and this estimate is too high when mowing machines are used.

Neat Cattle.—I am not sufficiently posted up on the expense of raising neat cattle to give you the items. I would remark, however, that they are not very neat; most of them, except the cows, being old stags, who get their living by plundering their neighbors' corn-fields when not gathered in season.

Fruit.—The culture of fruit is receiving considerable attention in this section; but it has so many enemies to contend with, that it takes a man with strong resolution not to give up in despair. First comes the borer, which commences at the surface of the ground; and if a man does not watch his apple trees with both eyes open, they are dead and gone before he knows it. For the last three seasons *the blight* has killed hundreds and thousands of fruit trees, mostly apple and pear trees. Some think it is caused by electricity; while others seem to refer it to the flow of too much sap into the tender shoots, either causing them to burst or be scalded by the noonday sun. None of them are satisfactory to my mind; but I will give you my observations. On the 27th of May, the trees in my orchard being remarkably thrifty, there came up in the afternoon a tremendous storm of wind, rain, thunder, and lightning, twisting the young and tender twigs about in every direction; which was followed the next day by a clear sky and very warm sunshine. Within three days I noticed the first attack of blight, by the drying up of the last year's growth.

Yours, truly,

T. DUDLEY.

JACKSONVILLE, MORGAN COUNTY, ILLINOIS,
November 23, 1851.

DEAR SIR: I perceive by your Circular that you desire information on all topics pertaining to the interests of agriculture from those who may possess practical information relative thereto. There are two subjects which have engrossed more of my time, thought, and means, since I came to this State, about 20 years ago, than all other subjects combined. The *first* is, the best mode of fencing our vast western prairies; and, *second*, the best mode of giving a practical and appropriate education to the people destined to inhabit them. I have ever considered the vital interests of the West to lie in these two points alone; and as my mind is now fully made up on both of them, I propose to give to the public an outline of the results, for their consideration, through your Annual Report, should it meet your approbation.

I shall make a few remarks on the former topic in this paper; and as we are now about making a movement in our State on the latter subject, on which I am preparing a report for the convention, I will forward the report as soon as it comes from the press, if desired.

The plan contemplates a systematic course for the liberal and practical education of the *industrial classes*, especially farmers, horticulturists, and mechanics, and should be adopted by all the States in the Union simultaneously, if approved by them.

In respect to the topic of fencing the prairies, and other lands destitute of timber, I commenced a course of experiments some 15 years since; and I believe I have personally tried every mode of fencing, and every plant, tree, or shrub, that has ever been recommended for a hedge in the western country. Of course I failed with nearly all of them; indeed, I may with safety set them all down as utterly hopeless and worthless in this climate, except two or three varieties of native thorn and the Osage orange.

The latter has now become the favorite hedge plant with all our people. It has a fine bright, glossy leaf, with a long, sharp thorn under every leaf from top to bottom. It is exceedingly beautiful in the hedge-row; will bear clipping at any season, and to any extent; is entirely free from all sorts of insects at all seasons of the year, and from all blight and mildews; is very long-lived; stands uninjured by all sorts of stock; and with good care will make on our soil as firm a hedge in 3 or 4 years as the various species of thorn will in 8 or 10.

How far north its culture may be extended I cannot say; but I saw it in my travels last fall, in northern Illinois and Ohio, around Bunker Hill monument, in Massachusetts, and in various other places in the northern and eastern States, in tolerable good condition, though by no means as vigorous as in its native prairie home. It is said, also, to exhaust the soil much more at the North and East than it appears to do in the West and South.

The favor with which it is now regarded by our practical farmers may be inferred from the following facts: I commenced my experiments on this hedge plant some 10 or 12 years ago, not knowing at that time that it had ever been used for the purpose. Plants were then sold in our western nurseries, for ornamental shrubs, at $1 each, or $500 by the thousand. Several years elapsed before it could be properly tested as regards

climate, soil, thickening, shearing, &c., &c., and then several more before any quantity of seeds or plants could be procured; and when at first a few plants were offered for trial, it was only with great difficulty that a few personal friends could be induced to take them entirely at my own risk.

The articles written for the papers were regarded as chimerical and visionary by sensible and judicious friends; while strangers almost uniformly pronounced it a "humbug," and an attempt at another "Morus Multicaulis speculation." It was in all quarters met with skeptical doubt, or frivolous sneering and derision.

But times have changed: the plants already set continued to grow and assert and maintain their own merits, year by year making surprising advances in the farmers' favor, until last year hundreds of bushels of seed, at from $20 to $30 per bushel, were consumed in the culture in our State alone; and the entire crop for next spring, amounting, by the estimate of some of the largest growers, to 25,000,000 of plants, in our vicinity was all engaged a month since, and orders for hundreds of thousands have been sent in, which cannot be filled for a year to come. Preparations for raising plants for the next season are immense; and probably there will be more than a full supply produced, and a temporary loss sustained by the growers; but if so, it will only be a customary transient evil, affecting comparatively few persons, and will soon right itself.

The mode of culture is to sow the seed in drills in the nursery after it has been carefully sprouted, and cultivate it with care till the plants are of suitable size for the hedge-row; then they are taken up by the nurserymen, and sold to the farmers, and often forwarded to all parts of the country with entire safety. I have myself forwarded them to orders presented from almost every State in the Union—from Vermont to Georgia and southern Texas, on the east and south, and to upper Missouri and Wisconsin, on the west and north.

The plants have always grown and done well, except in the few cases where accidents of heat or frost befel them in their passage, or where the extreme rigor of the northern winters proved too severe for them. It is a rule in our climate that they will grow on any ground which remains dry enough for three months in the year to bear corn, though covered with water all the rest of the year. Hence on our river hollows and ravines we throw up a ridge, if the ground is swampy, high enough to raise them above water in the dry months, and leave them to overflow the rest of the year as they please. At first, as the seed was costly and precarious, the plants sold high, and many intelligent men supposed it would be impracticable ever to reduce the price so as to render them accessible to all the farming classes. But a better knowledge of their nature, and increaseof skill in their culture, have already reduced it from $5 to $2 50 per thousand, delivered at the door of the purchaser; which brings the usual cost of the outlay for a hedge at from $6\frac{1}{4}$ to $12\frac{1}{2}$ cents per rod, as the plants with us are usually set about one foot apart in the row; though some prefer six inches for small stock and speedy use.

The hedge row is set, cultivated, and trimmed, from year to year, on the same principle as when made of any other plant; only that, from its vigorous growth for the first few years, it needs a much more vigorous

and efficient dwarfing, by pruning, than any other plant in my knowledge.

Here is the great trouble with our nurserymen: they cannot persuade the farmers to cut down, and *keep down*, their plants till a sufficient bottom is found for the hedge. Many let their plants grow up: it seems to them such a waste of time to follow the directions always given them by the growers of plants, and those experienced in hedges; and consequently their plants grow too high and rank, and open at the bottom, so as to allow the passage of pigs and fowls, &c.; and after two or three years they are forced to cut their hedges quite down to the ground again and begin anew. Fortunately for them, the plant will bear to be cut or even burnt quite down to the ground year after year without impairing its vitality, so that the heedlessness of one series of years may, in this respect, be repaired by the care and skill of another.

As particular directions for culture and trimming, &c., are always forwarded by the growers with every lot of plants sold, and as the information is now already widely diffused through the periodical press, it probably would not be desirable to cumber your pages with a repetition of it.

These are the general facts connected with this vast interest of enclosing our timberless lands. If latent errors or causes of fear lie concealed, I am at a loss to conjecture, after a wide correspondence with hundreds and thousands of practical men on the subject, what they are. And when I state to you that my present recorded list of personal correspondents amounts to over fifteen hundred, in all parts of the Union, you will perhaps readily see why I have not written more for the press, and more promptly answered the annual inquiries of your Department, and why I so briefly and hastily submit the present paper. I will enter upon no argument in defence of hedging. I have several miles of it out on my own grounds, and am well pleased with it. Several hundred miles have been put out under my direction the past few years. More is wanted the next spring than can be supplied; so that, if I am deceived, I am surely now not alone in the matter, as it was a few years ago, at least in our State.

Nor will I attempt any comparison of the merits of hedging with other fence. The facts with us have for twenty years been perfectly apparent to me. We have vast regions of the richest land in the world, where there is neither stone nor timber, which must either forever lie waste or be enclosed with a hedge of some sort, or be submitted to open culture. The latter our people do not like, and of course the hedge is their only practicable resource. I believe it both a cheap and a good one; they now believe so too; and there is no occasion for argument with those differently situated and of a different opinion. Should you have the goodness to publish this hasty sketch, I hope it will save me the trouble of writing many letters for the year to come, and thereby lay me under peculiar obligation to your courtesy. I also prosecuted a series of experiments on the apple, pear, and quince blight, last season, with some satisfactory results; but I cannot now possibly find time to subjoin my report of progress. The solar microscope aided me much in the process.

Most respectfully submitted by your obedient servant,

J. B. TURNER.

Hon. THOMAS EWBANK,
Commissioner of Patents.

DECATUR, MARION COUNTY, ILLINOIS,
October 10, 1851.

SIR: In answer to a few of the questions proposed in the Circular of the Commissioner of Patents for 1851, I offer the following:

Wheat.—We use no guano, nor any other manure, in its production; nine-tenths of us never *heard of guano*, and not one in five hundred ever *saw* any. Our average crop of winter wheat is perhaps 15 or 20 bushels to the acre. We seed from the last of August to the first of November; though early sowing is general when the Hessian fly is not troublesome. Four or five pecks is the usual quantity sown to the acre. It has been suggested to sow some five or six pecks of oats with this amount of wheat, especially in the case of early sowing; as, by this means, the ground is protected from high winds during dry frosts; the dead tops of the oats during the most severe weather, in the absence of snow, answer as an excellent protection to the otherwise naked wheat. We plough our ground but once for the crop, and then harrow or brush sometimes, but not always. Crops are not so good on ground six, eight, or more years old; hence, we may say they diminish. We have no particular *system* of rotation, though we generally follow a crop of wheat by Indian corn; seldom growing two crops of the same kind in immediate succession, except Indian corn, which is our chief crop. We often follow oats with wheat; as, by this means, the green oats are had to protect the wheat without the cost of seed. The best remedy I know of for Hessian fly is late sowing; or to sow *very* early, and then let calves, sheep, and other light stock eat the green wheat close to the ground during winter. Formerly, my father did this as a matter of pasture, and never had any trouble with the fly; raising very good crops. Our medium price at Springfield is from 50 to 60 cents per bushel.

Oats are raised in abundance. Eight or ten pecks are sown to the acre; and the yield, we suppose, is from 30 to 50 bushels. They do not exhaust land much.

Rye is most frequently sown early in August for winter pasture, and the crop the next summer is pastured down by hogs. It is sown one bushel to the acre; and often among corn and thick weeds, (the earth beneath the shade of these being rather damp and mellow,) without any culture whatever, with the greatest success. We cultivate no renovating crops particularly.

Clover and *timothy* are our best haying grasses. *Red-top* for low-lands, and *blue-grass* for high-lands, are the best for grazing.

Cattle are little improved, though the raising of them *pays well*. Most of our steers go to the Ohio and eastern markets. At three years old, the average price is about $20. To break young steers, we often yoke them up in couples, and let them remain so a few days, until they learn to walk and feed; then put them in a team of two or three pairs of broken cattle; they generally walk quietly along, and in a few days, as their necks become toughened, they learn to pull. This is the best way, we think; though single pairs may be broken by first driving to a light log, a very strong cart, or something they cannot injure, in case they should run against trees, stumps, &c., as they are almost sure to do. Their going in the yoke a few days before working is *very important*, and often prevents sullenness. Should steers be obstinately sullen, it is far

the best plan to turn them loose in most cases. None but the most skilful and *patient* drivers will break them without injury.

Horses and Mules.—The raising of horses and mules is very profitable. These, with *cattle*, are our *chief staples*. Too much gentleness cannot be used in breaking horses, and *especially* mules, to the harness, generally; though sometimes it becomes necessary to "make them know their masters." Good mules, at six months old, are worth $25; and afterwards the prices may be much enhanced by judicious breaking and matching. They should be handled young.

Veal is of late years grown pretty extensively, with good profits. No statistics worth noting.

Hogs pay well *sometimes*—serve as our scavengers to follow the cattle, &c., themselves receiving but little attention for the most part.

Root Crops are not much cultivated.

Fruit would, and does pay well, when attended to.

Forest Culture should be more attended to in our Prairie State. I think our timber lands should be replanted with black locust, and other quick-growing trees, different from those last on the soil. Who will suggest a list of kinds? Timber can quite quickly be raised on the prairie from cotton wood, sycamore, black locust, &c. The former two burn well, and the latter is valuable as an enduring timber. We propose to settle our prairies by hedging with the *Osage orange*, and raising firewood from *peach* trees or cotton wood. The matter will, without doubt, succeed. From three to five years answer for these things to be of service.

Yours, cordially,

JOHN DAVIS.

MISSOURI.

BRUNSWICK, MISSOURI,
December 1, 1851.

SIR: Your Agricultural Circular of last August has been placed before me, with a request to furnish such information as may be useful for your forthcoming Patent Office Report.

Brunswick, in Chariton county, Missouri, is on a direct line west of Baltimore, Maryland, and is situated at the mouth of Grand river, at its junction with the Missouri; and the Grand river country, on which we are dependent, in a great measure, for our produce, is a large body of alluvial timber-land, interspersed with rich upland prairie, extending widely on both sides of the river, from which it has its name. Northward, into the State of Iowa, the settlements are new; but the population is very fast increasing, especially since it is apparent that the Hannibal and St. Joseph railroad will be built and pass directly across this fertile region.

The principal staple productions are tobacco, hemp, wheat, corn, hogs, and beef-cattle. Of these it may be proper to say a few words in their order.

Tobacco is not raised far off the Missouri river, at present, owing to the cost of transportation. The growth is larger than in the eastern

States, and the average yield may be set down at 1,000 pounds an acre; but instances frequently occur of raising 2,000 pounds. The soil is scarcely, if ever, manured, even by the most common products of the barn-yard; and several tobacco crops are raised in succession on the same spot of ground, with very little attention to rotation of products, or thought of exhausting the deep soil.

The *Hemp* crop, like the culture of tobacco, is on the increase. Every year new hemp-lands are opened. The average yield per acre is about 1,000 pounds, and the height of the stalk 10 feet. The Kentuckians, who emigrate here to raise hemp, say that we have the best hemp-lands in this State which they have ever seen. I cannot properly estimate the relative cost of tobacco and hemp culture; but as a general thing, hemp neighborhoods are the most prosperous in the country.

Wheat grows to great perfection in the counties north of us, when it is properly in, and sown early enough in the fall to take deep root; but it does not bear transportation well over our bad roads to the river. Manufacturing mills are yet very scarce; and we present the singular anomaly of being in a good wheat country, into which we *import flour* from other quarters. Spring wheat is not sown. Seeding-drills and reaping-machines are yet unknown among us.

Indian Corn grows in the greatest abundance everywhere. The average crop is about 10 barrels (50 bushels) to the acre; but sometimes it reaches much more. The prevalent kind of corn raised is the large white, dented gourd-seed grain; and the stalks frequently reach a height of sixteen or seventeen feet. I have known the same field cultivated ten or fifteen times in succession with tolerable crops; but evidently showing that the top-surface was exhausting.

Hogs.—The best breeds of hogs are the Berkshire, or a cross between the black Berkshire and white Irish. The system of fattening pork-hogs here is to let them run and feed on hazel, hickory, or oak mast till late in the fall, and then finish the process with a few weeks of corn feeding. Even without mast, it is calculated that two barrels of corn will fatten a hog; and the growth of the animal, while thus fed, will average from three to five pounds a day. The method of preparing bacon is, by rubbing ground alum salt on the pieces, as they are put down in bulk, before the meat has time to freeze; it is again resalted, after a while, or dipped into brine, and then hung up to smoke with hickory wood. Hams have to be covered with canvas and whitewashed, to keep in this climate. Mast-fed pork is equally as sweet and palatable as the corn-fed; but it is too soft and oily for summer bacon.

Barley, Rye, and *Peas* are scarcely cultivated at all, because there is no demand.

Oats are grown abundantly for home consumption only, and sold at from 15 to 20 cents a dozen bundles.

Beans of all kinds thrive well, but are seldom raised for market.

Flax is very much neglected, as the price of it seldom reaches $1 per bushel in this market; and there is scarcely any use made of the stalk. But should *flax-cotton* come into vogue, this will be a fine region for the cultivation of raw material.

Grasses.—This part of Missouri is probably superior to any of the western States in the excellency of its native and cultivated grasses; the blue-grass, growth of the Grand river counties, is the finest in the world;

the grass being hardy, vigorous, and luscious. The same may be said of the timothy and herdsgrass meadows. Cattle killed from our grass pastures are very fat and tender. Missouri beef has a good name abroad. The raising of neat cattle is an increasing business. Three and four-year-old steers are estimated, especially, at $12 and $16.

Wool-growing is not considered as profitable as cattle or hog raising, and has not yet excited much attention; though there is no doubt that it can be made much more profitable than in the eastern States, as the lands are cheaper and sheep grow fine and healthy.

Potatoes.—We hear very little of the potato-rot here; and potatoes, both Irish and sweet, grow to great perfection; though they are not cultivated for exportation. The same may be said of all esculent crops—such as cabbage, turnips, beets, and all that class of articles requiring a light, deep soil.

Fruit Culture is beginning to excite much attention, and the trees grow very fine and vigorous. Apples are a very sure crop. Peaches are frequently killed by the spring frosts; but are excellent when they come to perfection. Native grape-vines abound on the bluffs around Brunswick; and the grapes which grow wild among the bushes are a remarkably sure crop, and grow as large as rifle-balls. They are used for culinary purposes, and undoubtedly could be improved by cultivation. Foreign grapes have not yet excited much attention; but from their success at many points on the Missouri river, where the Germans have settled, we may yet expect our noble river to rival the Rhine in its vine-clad scenery.

Meteorology.—I have never kept a meteorological journal in this county but one year, (1845;) which, however, may serve as an approximation to other years.

The observations on the thermometer were made at 8 a. m. and 2 p. m. of each day; and months are summed up thus, in their medium temperature:

	8 o'clock.	2 o'clock.
January	34°	46½°
February	35½	49½
March	41	53
April	56	71
May	61	74
June	68½	77½
July	75½	86½
August	71	84
September	66	74
October	51	60
November	34½	48
December	20	25½

The coldest day in the year was December 1; the warmest day was July 19. The greatest variation in the temperature of any day was 34°, between 8 o'clock and 2 o'clock on the 19th February.

There was more or less rain on sixty-four days, and snow on eleven days. The deepest snow was not 6 inches; but we frequently do have deeper snows. The extremes of temperature—6° below zero, as in December; and 98° above, as in July—are not generally approached, and

very seldom exceeded, by a fair exposure of the thermometer. It does, however, seem singular that *December* was so much colder than the previous *January;* and I am not sure but that other years would change or reverse the result.

Very respectfully,

JOHN H. BLUE.

Hon. THOS. EWBANK,
Commissioner of Patents.

MARTHASVILLE, WARREN COUNTY, Mo.,
October 15, 1851.

SIR: Always willing to make such a use of the little knowledge and experience I possess as to benefit the public, I the more readily comply with your request for information on agricultural subjects, as, among the States from which reports are sent in, Missouri is, as yet, very poorly represented. I must, notwithstanding, for this time, confine myself to some remarks on *grape-growing and wine-making*, leaving other questions to other hands.

I might write a dissertation on the importance of that new branch of agriculture for our country in many respects, but will give only a few hints:

1st. If native wine could be brought into common use in this country, we would have a beverage by far superior to all in which people now take refuge for recreation's sake—a beverage healthy, because of being (as it ought to be) unadulterated by spirits and all other admixtures—really refreshing, strengthening, exhilirating, &c.; contributing to subdue the somewhat spleenish, choleric, and vindictive propensities of this nation; and replacing them by a serene, jovial, harmless, friendly, and sociable national character—at the same time a cheap drink, not denied even to the poor, provided that we can raise it in sufficient quantities.

2d. We will annually save millions to our own country by substituting our native wines, which, in my judgment, and according to my experience, can, by proper management, be raised to a high degree of perfection, for the produce of foreign nations.

3d. We may procure a pleasant, healthy, and profitable employment to thousands even of the poorer class, who now toil and pant under less appropriate occupations.

4th. We shall make highly valuable millions of acres of land now not worth the tax to be paid on it, and render large sections of the country, now desert, flourishing and prosperous.

For these reasons, I would venture to express the wish that this entirely new branch of domestic industry should receive, also, at the hands of Congress all possible protection and furtherance.

The Catawba grape, extensively cultivated in Ohio, and already also in Missouri, Illinois, &c., yields, under proper management, a wine that leaves nothing to desire; but, being a native of the Atlantic seacoast, and delicate by its nature, it seems not fully adapted to the sometimes damp and sultry summer weather of the Mississippi valley, the greater portion of which (being, at the same time, an extensive inland country)

rises little above four or five hundred feet over the level of the ocean. By such weather ruinous mildews are engendered, of the effects of which the Catawba is highly susceptible: the whole growth of the plant is then interrupted, its health injured, the leaves turned brown, and the circulation of the sap, and the necessary evaporation, stopped; the consequence of all which is, the rotting of the berries, beginning at the time they have attained half their growth, and ending only at the time of their full maturity. There are more or less favorable years, situations, soils, &c., and the amount of damage done varies greatly; but, on the whole, it must be confessed, *the Catawba is too much liable to the rot*. The years 1850 and 1851 were especially remarkable for the extensive effects of those mildews. So far as my observation reaches, from the end of June the leaves of the *white oak* had a brownish, unhealthy appearance all over the country. Other vegetables suffered more or less, but none so much as the Catawba vine; and there is no remedy for that within human power, albeit something may be done to alleviate the detrimental effects. It has, therefore, long been my conviction that we must not merely, perhaps not chiefly, depend on the otherwise noble Catawba, but turn our minds to the culture and improvement of the native grapes of the Mississippi valley, the number of which is legion, but greatly differing in their adaptation to culture and fitness for wine-making, and in other properties. At all events, however, they must be deemed to be, by nature itself, best accommodated to our peculiar western climate.

According to my own experience, (may others communicate theirs,) the following sorts stand our climate well, being little, or not at all, susceptible of the rot: the *Halifax*, (wine mild and spicy,) *Norton's Virginia seedling*, (difficult to propagate, wine fiery and aromatic,) the *Rock-house Indian*, (first cultivated by Dr. Bock, near Waterloo, Illinois; wine not inferior to the best Burgundy wine, and similar to it,) and the *Wine-home* grape, a native of Warren county, Missouri, of which I have just, for the first time, pressed about half a bushel of berries, promising well. According, however, to the best information I was as yet able to get, the most delicious varieties of wild grapes are found on the southern declivities of the Ozark mountains, near the boundary of Missouri and Arkansas, to which region I intend to travel this fall, in order to make further experiments with their cultivation, anticipating great results therefrom. I have also a beautiful Scuppernong growing in my vineyard, which will probably bear next year. As to the treatment of the vines I must, in general, agree with the report of Mr. R. Buchanan, page 314 of the "Annual Report of the Commissioner of Patents" for 1848; with reference to which I will, for this time, restrict myself to the following remarks:

1st. Planting three by six feet, or four by four or five, as they do in Ohio, would not do in Missouri, as with us the growth of the vines is too rank for such small dimensions. The least, in Missouri, seems to be five by six. With good success, I have planted six by seven in the Roman *quincunx* order; or, for espaliers, eight by eight, or ten by seven.

2d. I do not like to tie my vines to single stakes for more than one season. By our way of planting, we either tie to espaliers, bending the vines over the laths, or put for each stock three stakes into the ground, they being, on the ground, three feet apart, (triangular.) At the height of five or six feet all three are tied together, with the three horns standing

out about two feet. This is the pyramidal way of tying up, already in practice with the old Romans, and offering great facilities. The vines are serpent-like, tied up around the pyramid. The grapes will hang inside, and be well sheltered. No gale of wind will break down the firm frame.

3d. Of course we leave more fruit-bearing vines, and cut down the same to the double amount of joints, being always careful to raise fresh vines from down below, in order to have our stocks constantly renewed and the older vines removed.

4th. The proper time for pruning is from the end of October to early in March; prune, if possible, in November.

5th. Put your slips into the ground just when you perceive that the buds are swelling—late in April, or early in May.

6th. A very simple rule for pruning is this: take away about half the wood of the whole stock, leaving one-half; thus your vines will be strong enough to grow and bear.

7th. Hoe your vineyard over twice every month, from April to September, (it will save you trouble); but let it rather be a scratching than a hoeing.

8th. In the place of putting "the bung loosely" on your casks during fermentation, put on the bung-hole, first, a grape leaf, and upon that a small bag filled with fine, and not quite dry, sand. In good cellars, and large casks, your wine will, and must not clear in less than six or eight weeks. Rack off in March, then again in midsummer, and then again just before the time of the next harvest. Before every racking, have your casks well sulphurated. Then, first, your juice is real wine, and may be bottled; it will keep—unless drunk—as long as you please, and improve considerably for a series of years.

This year and the last I have failed in the quantity of wine raised; but as to the quality, I pretend to say that my product is "hard to beat."

Agriculture, on the whole, has, in Missouri, advanced not far beyond its infancy. The people are generally following the *exhausting system*. Everything is wasted—timber, soil, and all. A farm improved 30 years since is deemed to be an old place. A field that has yielded 20 crops is, as a matter of course, worn out. The weight pressing on our agriculture—as, indeed, on everything else—is the *system of involuntary labor*. I could adduce many instances of old settlers being compelled to leave their places because they could no more on them "raise bread enough to feed their niggers." Their only shift is, then, "to sell out and move." Perhaps an industrious German will buy the ruined place, restore it to fertility, pay off the purchase money in five years, and be independent and "very well off" in 10 years. I do not deny that there are careful husbandmen among the old as well as new settlers; but the prevailing rule is to waste and move. Latterly wheat-growing has vastly extended in Missouri, and our wheat commands a good market. I hope we may look for a new and better era, a new stimulus being discernible among the people all over the State.

Accept the assurance of my high esteem,

FREDERICK MUNCH.

Hon. THOMAS EWBANK,
Commissioner of Patents.

IOWA.

NEAR FORT MADISON, LEE COUNTY, IOWA,
December, 1851.

SIR: I have received your Agricultural Circular, and herewith furnish some answers to your queries.

Wheat.—The varieties used for fall sowing are, the old red-chaff bearded, velvet, smooth red-chaff, and smooth white wheat.

The first-named variety is the favorite, although the velvet wheat will occasionally outyield it; still it is the surest crop. There is no guano used here. Our country is new, and farmers have not used manure; but I think clover sod would produce better crops of wheat than we now raise. The average product per acre this season would not exceed 15 bushels. From the accompanying record, (see Sec. vii.,) you will see we have had a very wet spring. This injured our wheat crop very materially. Time of seeding, the month of September; of harvesting, from the 5th to the 12th of July. Seed is not prepared, but sown as it is, generally. Quantity sown, from one to one and a half bushel per acre. Oat stubble is ploughed twice; the first ploughing shallow. The object is to turn under the shattered oats that are on the ground. After the grain has sprouted and come up, then we plough 6 or 7 inches deep, and harrow our wheat in good order. The yield is decreasing. All the system of rotation of crops is to follow corn with small grain.

Hessian fly we have no remedy for. In the fall of 1850 a young farmer, living in the bottom lands of the Mississippi, had a good prospect of early-sown wheat, but found that the Hessian fly was injuring it very much. He turned on it calves and sheep; pastured it bare; then rolled it with a heavy roller, and again rolled it in the spring. The wheat produced well—better than any of his neighbors.' There is no weevil here; but the Mormon bug is an enemy to the wheat crop in the fall season. It is not as bad as formerly. Price, from 50 to 60 cents at Fort Madison.

I have no doubt but the roller is a great benefit to the wheat crops. Some of our farmers are beginning to use the drill in seeding.

I have received the package of Troy wheat which you were so kind as to send me, for which I return you my thanks. In consequence of its coming to hand so late, I did not get it in the ground until the 17th of last month, (November.) I drilled it in with the hoe on an excellent lot of ground; and, should the rust not take it, as it does generally our late sowing, I will have a good start from it.

Corn.—This year nearly a total failure, from the wet weather in the spring; not more than ten per cent. raised this season. Our customary average is 50 bushels per acre. Cost of production about 8 cents per bushel. The system of culture—first harrow, then plough three or four times; no hoe used. This is almost the only system of culture.

The grain is fed raw. We have corn and cob-crushers; but have not had experience enough to tell their advantage. Fall ploughing is best for corn. It pulverizes, and, to some extent, fertilizes the soil, and increases the product from ten to twenty per cent.; and the crop is easier cultivated, or tended, as we call it, in our vernacular tongue.

Oats.—This crop generally follows corn, and succeeds better in fall ploughing. Seed per acre, from 2 to 3 bushels; produce, from 30 to 50

bushels per acre. Harvest, about 5th August. Barley is the least exhausting as a crop, and is the best stubble for wheat; but is not much sown.

Rye, Peas, and Beans.—Not much cultivated. Peas and beans only in gardens.

Clover and Grasses.—Timothy and red clover are sown on our prairies when the sod is completely rotten, and the soil in a good state of cultivation. Quantity sown, about a peck of timothy and some clover seed in the chaff per acre. When manured with stable manure—the only kind used—produces two tons and upwards per acre. Our prairies have no means of irrigation, and meadows soon run out. Wheat on timothy sod has always been a failure.

Dairy Husbandry.—Average product of a good cow, about 200 pounds of butter, or from 200 to 300 pounds of cheese, per annum. Average price of butter in 1851, 10 cents per pound; cheese, 7 cents. Old-fashioned churns still used.

Neat Cattle are raised with but little cost—salt in the summer, and the range of the woods or prairies; and in the winter, a little corn, salt, and straw. Price of native animal, $10 to $15; good milch cows, from $12 to $20. Very few Durhams. It is thought that a given amount of food will yield more meat in a Durham than in a native.

Steers, when yoked first, are put on the tongue of a wagon, or the hindermost yoke in a prairie plough; then put on an old yoke before them, and they generally soon give up.

Horses and Mules.—The growing of both profitable. Cost of raising horses to three years old, about $20; mules, about $12. We work our brood mares two weeks after foaling, and raise good colts. We have no good stallions here. The best way to break a colt is to put him with a steady horse to the tongue of a two-horse wagon, and treat him gently. Forcible, cruel usage in breaking ruins many a good horse. Mules require more harsh usage.

Sheep.—Wool-growing is profitable. Large sheep are more profitable for mutton or for their fleece. A merino sheep will not produce more than half as much wool as a native sheep, but the difference in the price will make up the loss. We feed generally on sheaf-oats, and our sheep do very well.

Hogs.—Best breed, China and Byfield crossed; Berkshires are not much esteemed of late. The only method of raising hogs here is by feeding corn to them in pens or small fields. There is no doubt that the clover-lot, or the orchard, will soon succeed the present mode of raising hogs.

Cotton, Sugar-Cane, and Rice.—Not raised here.

Tobacco.—Only in gardens, to a small extent.

Hemp.—Some raised.

Root Crops.—Only raised in gardens.

Potatoes, (Irish.)—A failure this season; the rot was bad. Meshannocks the favorites; yield from 200 to 300 bushels to the acre, in a good season. Cultivation: plough the ground in the fall; plant in hills; plough and hoe twice. Cost of production, in a good season, about 6 cents per bushel.

Sweet Potatoes.—The yam is the most productive. Plant, after sprouting, in hills; tend with the hoe. Manure is but little used; but, when used, it increases the product very materially.

Fruit is receiving increased attention. As yet, there are not enough apples raised for home consumption; consequently we cannot tell their value for the purpose of feeding hogs or cattle; but there is no doubt that the sweet apple would be profitable. Rawle's Janet, Rhode Island greenings, and pippins, are among the best of our keeping apples for winter use.

The best and only remedy for blight on pear and apple-trees is a full and unsparing use of the knife. Cut below the blight some distance; if you lose the limb, you save the tree.

There are some of our farmers advocating budding or grafting of the peach and nectarine on an almond stock. This would prevent the grub that works in the root, and perhaps would be a remedy for the yellows. I have not had experience enough to give any directions as to transplanting, budding, or grafting, but would always prefer the spring as the time for transplanting. Pulverize the ground well by ploughing and harrowing; dig large holes; mark your trees in the nursery, and plant in the same position that they stand in the orchard. I have seen hardy apple-trees grafted on the black locust, that did well; they are in Clarke county, Indiana, 4 miles southwest of Charlestown, in the orchard of Mr. John Blizzard.

Will Mr. Neff, near Cincinnati, Ohio, please to give us his experience with the Osage orange in hedging? We understand that he first planted it in 1837. Should this meet his eye, or any other farmer that has that or a longer experience, they will confer a particular favor on us, inhabitants of the prairies, by giving us all the information they can about planting, cultivating, and trimming, in the Report of 1852.

You will find the meteorological record accompanying this.

Respectfully, yours,

D. McCREADY.

Hon. THOMAS EWBANK,
Commissioner of Patents.

WISCONSIN.

SHARON, WALWORTH COUNTY, WISCONSIN.
November 20, 1851.

SIR: Your Agricultural Circular of August was duly received and noted. I reply as follows:

Wheat.—The average production the present year, for winter, is twenty bushels, and spring, twenty to thirty bushels per acre. Time of seeding, winter, from the 1st of September to the 15th. Spring, from the 1st of April to the 20th. Seed, two bushels per acre. Time of harvesting, from 20th of July to 15th of August. Ploughing our land, twice for winter, once for spring wheat.

The crop is decreasing one-eighth. Our markets are Racine, Southport, and Milwaukie. Average price, 55 cents for winter, and 35 to 45 cents per bushel for spring.

Corn.—We plant from 20th April to 15th May. Seed mostly yellow; the yield, from thirty to fifty bushels per acre. Manuring would increase the product from ten to twelve bushels per acre.

Oats and Barley.—Will yield from forty to sixty bushels to the acre, requires 2½ bushels, per acre, of seed, and are less exhausting to land than other grains.

Peas.—Are considered a renovating crop; not grown here to much extent, but generally approved for preparing land for wheat.

Grasses.—Timothy will cut two or three tons per acre; clover, about the same. Blue grass makes fine hay, and will yield from 2½ to 4 tons per acre. Our lands best adapted to meadows are alluvial and moist; and, next, burr-oak land, seeded with six quarts per acre.

Dairy.—A good milker will make 8 pounds of butter per week for five months in a year. Average price, ten cents per pound.

Cattle.—Cost of rearing, until three years old, $9; usual price about $12 per head.

Horses.—The growing of these animals is profitable. Expense of rearing, till three years old, about $30; worth from $40 to $100. Brood mares should be used carefully on a farm; ploughing, dragging, &c., will not hurt them. They should not be over-heated or driven hard.

Sheep and Wool-growing.—Wool-growing is profitable. Cost of growing fine, 15 to 25 cents per pound; coarse wool, from 10 to 15 cents per pound. One ton of hay will winter five sheep, which will shear from three to four pounds of wool each. It is safe to calculate two lambs to three ewes, although they frequently double the flocks every year. The large Bakewell sheep are best adapted to this climate; the mutton being the most desirable.

Hogs.—Best breeds, a cross of Berkshire and Liecestershire. The latter makes the heaviest pork. Ground grain is the most desirable for fattening, making one-fifth difference in the expense.

Roots.—All esculent roots grow well here as field or garden crops. Beets, turnips, and carrots will yield 150 to 200 bushels per acre. Common barn manure is sometimes used.

Potatoes are decreasing. The rot has injured one-half to two-thirds for two years past.

Fruit.—Fruit culture is in its infancy in this vicinity. Apple and cherry trees are beginning to bear. I think it will not be a good fruit country.

Meteorological.—Extreme heat at meridian, from 86 to 100 deg. Fahrenheit. Cold, from 15 above to 26 deg. below zero.

Having lived South most of my life, I am not as well informed as I would like to be on the agricultural productions of this country.

With profound respect, I remain yours, sincerely,

H. S. YOUNG.

Hon. THOMAS EWBANK,
Commissioner of Patents.

ALLEN'S GROVE, WALWORTH COUNTY, WISCONSIN,
January, 1852.

SIR: Having been requested by the Commissioner of Patents to give a short history of the habits of the buffalo, elk, and moose, I will attempt to do so, as far as my knowledge extends:

The *buffalo* is an animal little known now, in the wild state, within the borders of the white settlements. They have been driven back to the Rocky mountains, or nearly so; still, hundreds, if not thousands, are annually taken and killed for their robes, and a small portion of their meat and their tongues, which are the only parts that many hunters save when they are plenty. If they were permitted to live and increase, and no more were killed than what are wanted for food, there would be a full supply for many years to come for the poor Indians. The buffalo resembles the ox and the cow, as to what they subsist on, their size, and common habits.

I have seen them running with the common cattle on the plains, in Wisconsin, perfectly domesticated. I have seen them mixed with other cattle, and a calf from a common cow not more than six weeks old, that appeared as tame, or nearly so, as common calves of the same age. I have seen the buffalo yoked with the ox, and they have both worked together. As I am credibly informed, they were found all over the prairie States in former days, west of the lakes; and I learn some have been seen lately in the western parts of Iowa. A few are quite large, with short, large horns, standing very straight out each side. Some people are very fond of their buffaloes.

The *elk* is an animal about the size of a slim, two-year old colt. Some are much taller; their horns are very large; they have been known to be five feet long, and almost as far from tip to tip. Their color is a deer or mouse-color; the body is rather slim and light for its height, and they run fast when they have a clear track; but I have seen those who said they had known of their being caught in a thicket by their horns, and could be taken without difficulty. When they run, they throw their horns on the back of their neck; their nose sticking straight out before.

The *moose* is not so large as the elk; still they resemble each other very much. Their color and habits are much the same. They can both be tamed and domesticated, and worked like horses.

I have seen a number of each in a yard together, and seen them handled, rode, and harnessed; some of these have their horns sawed off, hat they may not be as likely to hurt their owner or themselves. They are not as wild as many other animals; they can be taken and domesticated much easier. They live upon grass and shrubs, preferring small bushes, on account of their short necks and long legs. They are good for venison, and their horns are very valuable; they are hunted very frequently in winter for their horns and robes. They are both found in the West in great numbers; many in Iowa and Minnesota.

I have seen the moose in Vermont, and think that they have both been found in most parts of the United States. The old ones shed their horns in the winter, but the young ones in the spring, annually. They can both be taken easily in the time of shedding their horns, as they appear dumpish, and indisposed to roam about. Their hides make good leather; and, taken in proper season, make good robes. Their feet are slitted like the deer, and all of course are of the same species.

P. S.—I would say a few more words respecting the buffalo. He is built largest forward; his fore-quarters being one-third heavier at least than his hind ones; and the hair or fur on the shoulders and neck is much longer than behind, giving him a lion-like appearance; his tail is

long and slender, without much hair, except at the lower end, which is very long and bushy.

When frightened, in large droves, they have been known to run over teams, wagons, or whatever came in their way, those following behind pressing them on.

The *badger* is an animal inhabiting our State. They are a little larger in size than a large coon, and resemble it very much. Their face is very handsome, and appears intelligent; their fur is very thick, coated with long hair of a reddish, brindle color, except underneath, which is white; they have long claws and sharp teeth; there are but few dogs that can kill them. They live in the ground in the day time; dig very fast, often digging a hole when morning overtakes them. They live upon such animals and birds as they can catch, and upon vegetables. I believe they burrow up in the winter. They are thought by some to be very good eating, and their skins are much sought after. They are slow in their movements, like a wood-chuck or ground-hog; but, when approached in their dens, they are a powerful enemy to conquer.

H. ALLEN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

HEART PRAIRIE, WALWORTH CO., WISCONSIN,
January 26, 1851.

SIR: Your Circular was duly received. On looking over your list of inquiries, and your Report of '49 and '50, I find little or nothing said on the subject of *harvesting grain in the West*. I will, therefore, with your permission, say something in regard to the various modes in which it is done, and the relative cost to the prairie farmer.

Wheat being a staple crop in the northwestern States, it is a matter of interest to us farmers to be well posted up on that subject, as it constitutes the major part of the expense in growing wheat, oats, and barley. It will not be necessary to say anything about reaping with the hand-sickle, as that has been laid aside many years.

The common modes of harvesting are with the cradle, reaping machine, and harvesting or heading machine. We will begin with the cradle, which is still used to a greater or less extent in all the wheat-growing States of the Northwest.

Cost of harvesting 16 acres of wheat, that will average 20 bushels per acre. An average day's work, cradling, is about 2 acres. Average wages, including board, $1 38.

To cut 16 acres would require 8 days, at $1 38 per day	$11 00
Raking and binding, the same as cradling	11 00
To shock, 1½ day	2 06
Stacking, 2 hands and 1 team, 3 days	9 00
Average cost of threshing, per bushel, 10 cents, or $2 per acre, 16 acres	32 00
	65 06
Cost per acre	4 07

2d. Cost of harvesting 16 acres by the use of *the reaper*.—It is claimed by good farmers, who own them, that they will cut, with the requisite force, 16 acres per day, and by some, under favorable circumstances, much more. We will, however, call it 16 acres, which is probably high enough. For a general average, to work a reaper requires 2 men and 4 horses.

2 men, at the same price as with the cradle	$2 75
2 pairs of horses, at $1 per pair	2 00
6 hands to bind, the same as with the cradle, at $1 38	8 25
1 hand, 1½ day, to shock	2 06
Stacking, the same as with the cradle	9 00
Threshing the same	32 00
Interest, wear, and tear of reaper	3 00
Total cost of 16 acres	59 06
Cost per acre	3 69

This shows a saving in favor of the reaper over the cradle of 38 cents per acre. It is claimed by some that five hands are sufficient to bind; which would make a still greater difference in favor of the reaper; and it is further claimed for the reaper that it does its work better than is usually done by the cradle. The principal advantage, however, derived from the use of the reaper, is, that the farmer has greater command over his harvest, and is, therefore, enabled to secure it with much less force, as it saves half the hands up to the time the grain is bound. According to the estimates, with the cradle it takes 16 hands to cut and bind 16 acres a day, while the reaper requires only eight; making a saving thus far of 50 per cent of manual labor; which, at a time when labor is in great demand, and wages high, is quite an item to the farmer.

3d. Cost of harvesting 16 acres by the use of the *harvester* or *heading machine*.—It is claimed by good practical farmers, who own these machines, that they will cut more acres per day than the common reaper, as they cut a much wider swath. We will, however, call a day's work the same as the reaper.

To manage the machine, requires one man and four horses; which, at the same price per day as the above estimates, would be	$3 38
To take care of the grain as it is cut, requires four men and two teams—one hand to each team, one hand to load for both teams, and one to stack	7 50
Heading can be threshed one-third cheaper than bound grain, which leaves the cost of threshing	21 34
Interest, wear, and tear of machine	3 00
Total cost of 16 acres	35 22
Cost per acre	2 20

Showing a saving by the use of the heading machine of $1 87 per acre. Notwithstanding this decided advantage, they have not met with as general favor as the reaping machine. They, however, have many

friends, and also many enemies—for which, there are many reasons: first, many of the machines were not well made, and, consequently, liable to get out of repair; and some fell into the hands of men not sufficiently acquainted with machinery to run them, as the machines first made were somewhat complicated. The machine, however, (as before constructed,) is not well calculated for this region of the country, for the following reasons, viz: the growing of winter wheat in the northern portions of Illinois, and in the States of Wisconsin and Iowa, has, to a great extent, been abandoned, and spring wheat substituted, which is very apt to lodge or crinkle down before being harvested. Even if it stands up when harvest commences, it is probable that it will be down before it is secured; so that it will be difficult to harvest it with a heading machine. In sections of country where winter wheat is principally raised, they are decidedly the best machine in use, as winter wheat usually stands up sufficiently well to be harvested by them; which is done at a very great saving of expense—even more than the above estimate.

The machine, however, in my opinion, to take the preference of all others now in use is one that will work well as a *header*, *reaper*, and *mower*. All these machines are needed by the grain-growing farmer. If his grain is in a condition to cut with a header, he will never think of using a reaper after having used a header, (if a good one;) but if his grain is down, so that it is not advisable to use a header, he then wants a reaper; and he also wants a mowing-machine to cut his grass. I have seen all these machines combined in a very simple, compact, and durable form: it performed its work decidedly better, as a header, than any machine that I have heretofore seen; it is by far the best reaper, so far as I can judge from its operations, with which I am acquainted; and it works equally well as amower. It requires only about fifteen minutes to change or alter it from a header to a reaper, and about ten minutes to change it from a reaper to a mower. The machines cost less than the large heading-machines.

Yours truly, and in haste,

GEORGE ESTERLY.

Hon. THOMAS EWBANK,
Commissioner of Patents.

PRAIRIE LA CROSSE,
December 8, 1851.

SIR: Owing to my absence, the most of the last three months, from home, it was not till within a very short time that I received the Circular of interrogatories from your useful Agricultural Department.

La Crosse county, you are probably aware, is a new, and quite lately an uncivilized, region of country. Its beautiful and fertile valleys were but recently the camping and hunting-ground of the *Winnebagoes*, who will in families, steal back from the Northwest, at this season of the year, almost daily, to visit this (to them) most charming spot, rendered sacred as their birth-place and the homes and the graves of their forefathers. Its resources, as yet, are but partially known, and much less cultivated. The northern part of this country, and along the banks of Black river, (which river empties into the Mississippi at the village of

La Crosse,) is a dense pinery. Some twenty-four saw-mills are now in successful operation on and near this stream, which is capable, at all stages, to float its own lumber to the Mississippi; upon which latter river lumber is always in good demand at high prices. Vast quantities of lumber are rafted in this pinery every season, and floated down to St. Louis, and sold at from $15 to $20 per thousand. This, of course, is an important item in the resources of the county; while the large number engaged in lumbering create a ready market for the home consumption of the productions of the farmers. From four to eight years these lumbermen have been engaged on Black river; and, about the same length of time, a few farmers have been located in different sections of the county, some of whom have tilled the soil extensively and successfully.

Winter-Wheat, I am informed, has never yet failed since its cultivation was commenced in this region, averaging from 35 to 40 bushels per acre of more than standard weight.

Our soil is a black loam, intermixed with more or less limestone, and is believed, by experienced farmers, to be well adapted to the growth of wheat, especially with the right kind of fertilizing material; experiments in which will most likely be tried the approaching season, when more accurate information can be given as to what kind of fertilizers will be required.

The other staples of the country are produced here in abundance with as little labor as in any portion of the West. In fact there can be but little doubt that the soil north and west of the Wisconsin river, in the State of Wisconsin, is better adapted to the raising of grain than the southern portion of this State and northern Illinois. The result of the last three years has clearly satisfied me of the truth of this remark.

Minerals.—It is believed by some that this county abounds in lead mines, as well as the southwestern counties of the State; which belief is induced from its similarity in geological appearance; but, as yet, no substantial indications have been discovered, except small particles of ore on the surface.

Quite an extensive iron-mine has been discovered in the northern part of this county, and preparations are now being perfected to work it.

You will not, of course, expect from a county just settling very much real practical agricultural information; therefore I will cut short this desultory reply to your Circular, and ask you to wait until we can acquire another year's experience upon our lands, when we shall be more capable of judging of its capabilities and necessities.

Wool-growing will, no doubt, enter largely into the business of the farmers in this section.

Very respectfully, yours,

A. D. LABUE.

Hon. THOMAS EWBANK,
Commissioner of Patents.

OSHKOSH, WISCONSIN, *December* 15, 1851

SIR: The average product of *wheat* in the vicinity of this place is 20 bushels per acre. The best time for sowing is the last week in August and the first week in September. Wheat, in any of the northern or,

western States, should be sown as early as above. It then has time to become firmly rooted, so that the frost will not heave it out, and is ready for harvesting about the middle of July.

The quantity of seed always depends on the soil. Black muck requires the least seed of any land. One bushel per acre is sufficient, if sown by the 1st of September. Sandy soil will require a half bushel more, if sown the same time. Wheat is better ploughed in than any other way. Plough the ground, and drag down; sow on the seed, and plough the same as before. This leaves the ground in the best possible shape for winter.

Peas should always be sown in the spring, on ground that is intended for wheat. This crop leaves the ground in the best condition for wheat; and peas are the best grain for fattening hogs I have ever used. I think one bushel of peas fully equal to two bushels of corn. If dry, soak them. For fattening hogs, peas should always be ploughed in, and two bushels sown per acre.

The average yield of peas is about 20 bushels per acre. And I venture to say that one acre of peas will make more pork than two acres of any other kind of grain.*

Respectfully, yours,

H. A. GALLUP.

Hon. THOMAS EWBANK,
Commissioner of Patents.

KOSSUTH, KENOSHA COUNTY, WISCONSIN,
December 10, 1851.

SIR: In communicating to you the result of the trial of a package of seeds you sent me last spring, I regret to state that two or three varieties of clover proved entire failures, especially the kind I was most anxious to have secured—namely, Chilian clover, of which not a single seed germinated. It was put into the ground in a careful manner about the 1st of April, in rich prairie soil. A continual succession of rains and cold weather might have been the cause. I found, upon examining the seeds, about three weeks after sowing, that they were being devoured by small worms, scarcely visible to the naked eye. The oats produced abundantly; also the spring wheat produced well, and escaped the prevalent disease in this section, (the rot or blast;) an indication of its being a hardy variety, as all other kinds of spring wheat were more or less injured by this disease. We have many fields of the variety called wedge—none proved entire failures.

Tobacco is beginning to engage the attention of the farmers in this section of the country, and sufficient has been raised this season, although very unfavorable to its production, to place the question of its successful cultivation beyond a reasonable doubt. The parcels you sent me were distributed, and were cultivated with a view to be prepared for seed for another season, in which it has produced ample returns.

[*The remarks in favor of peas for making pork are too strongly expressed. There is no satisfactory evidence that 100 pounds of peas will make more meat than a like weight of corn. And while an acre of peas gave only 20 bushels, two acres of corn might yield 100 bushels.]

Wheat has been the talismanic word here for the last twelve years, (I state only since my experience in this State,) as though there was no way to make a purchase or to pay a debt without a wheat crop; consequently, the wheat culture has been fairly run out of the ground. I think I am safe in saying that, for the last twelve years, so far as my observation has extended, more than two-thirds of all the land cultivated has been cultivated in wheat. The consequence is, that for the last two or three years the best fields have produced but about half a crop, and from that down to a total failure, the quality of wheat deteriorating with every succeeding crop. With many it has proved a disastrous experiment. With those who have pursued a varied system of farming, not so bad. This dear-bought experience will work a revolution. Comparatively little wheat will be sown another year.

Wool-growing and Stock-raising, and to some extent *Tobacco cultivation*, will engage the attention of the farmers. Spring wheat will be discarded more, and there will be a return to the cultivation of winter wheat in a more limited and particular manner. In this county about 12 or 15 acres of tobacco have been cultivated with good success this season. It was the first trial, and under favorable circumstances. In a few years I anticipate it will be one of the staple productions of the county, and perhaps of the State.

Average per acre of wheat in this county, not more than 10 bushels; of potatoes, not more than 30—many fields a total failure. Oats good, 40 bushels; corn, half a crop; hay, very good; flax, good for the amount cultivated, which is very limited, but growing more into favor.

Very respectfully, &c.,

PHILANDER JUDSON.

Hon. Thomas Ewbank,
Commissioner of Patents.

MINNESOTA.

St. Paul, Minnesota,
October 31, 1851.

Sir: I am anxious that our new Territory should not be without representation in your very valuable Annual; and, therefore, continue my effort to furnish material for the Report until some more worthy candidate presents himself.

The past year has been unusually wet, which has been unfavorable to many of our new farms; but to others, and particularly to esculents, it has been advantageous.

In a new country it is not to be expected that much will be done in the way of experimental farming—the extraordinary richness of the virgin soil rendering unnecessary all artificial methods of increasing the fertility. This is very much the case in Minnesota; for an experience of 15 years shows little exhaustion of the soil.

Two of my neighbors have favored me with communications. As one relates to old ploughing, and the other to an entirely new breaking, I

offer them to you to show the strength of our land when thrown into arable.

Mr. J. Brewer, of St. Peter's, writes me on the 10th November: "In answer to your inquiries, I have to certify that I have assisted during the summer of 1851 in raising the following vegetables:

"1 acre of onions (black seed) yielded	550	bushels
1 do cabbage	1,200	heads
½ do blood beets	300	bushels.
¼ do carrots	200	do

"The cabbages average 12 pounds each; some weighed 24 pounds after the outside leaves were stripped off preparatory to cooking. Six of the onions weighed eight pounds.

"This land has been cultivated 15 years, and has been manured about every second year with 12 cart-loads to the acre, of long and short manure; ploughed once in the spring, and not well weeded."

Mr. J. H. Stevens writes from All Saints, St. Anthony's Falls, 21st November, 1851: "My land was ploughed for the first time late in April last, and, of course, all my crop was raised on the sod. I had 45 bushels of oats and over 50 bushels of corn per acre.

"Of 2,000 cabbage plants, the average was 13 pounds. My carrots came to great perfection. I had them 23 inches long, and 12 inches in circumference. From three ounces of onion seed, sown broadcast, I harvested 13 bushels.

"All my crops, of course, were raised without manure, and, in fact, I do not believe our rich soil will require manure for years to come. One of my neighbors raised beets weighing 19 pounds each, and A. Godfrey, esq., had about 30 acres in oats, fifty miles north of this place, from which he has cleaned up 1,000 bushels, which, in that location, will bring him 75 cents per bushel during this winter."

All the ordinary crops of a farm have been raised with the same success as in former years, with the exception of the potatoes, which have been much destroyed by the rot. I think the extent of the injury has been about one-half.

There have been several experiments with apples, but hitherto with indifferent success, not from any difficulty in raising the trees, or their growing well, but in consequence of the ravages of an animal, common throughout the country, called the *Gopher*.

It burrows under ground, feeding on roots, and appears to have a great fondness for the root of the apple tree. This it entirely devours, beginning at the smaller fibres and eating to the surface, until the tree is destroyed. I have not found this animal well described in any natural history. It is about seven to ten inches long, of a mouse color, with teeth much resembling the musk rat; the fore legs and shoulders singularly strong for its size. It lives entirely under ground, being seldom discovered on the surface. But its great peculiarity consists in the pouch on each side of the head. When digging, this pouch is filled with earth, with which it proceeds to an opening on the surface, and, when there, by a sudden muscular contraction, (much like blowing,) the contents are ejected and form a mound. Many attempts have been made to destroy them with poison, but this method appears to me very objectionable, and I have found abundant success with traps.

With a spade you open the ground at one of their mounds, place a small trap (one with a single spring being the best for the purpose) low down in the passage; no bait is necessary. The Gopher appears to dislike the light, and very speedily comes laden with a supply of earth to close the hole. In doing this, he must pass the trap, and so gets caught. We shall find it necessary to exterminate this little creature, for they are seriously destructive to gardens. It will burrow along a ridge of potatoes, eating or carrying off the whole. Their voraciousness is surprising. A large cabbage will be eaten up by a Gopher in about three days. He begins at the root, drawing the cabbage down as he devours it, and you see it gradually disappear, as it were, under ground. With two traps, I suppose ten acres might be kept entirely clear.

At the risk of being tiresome, I must speak of the *potato rot*:

For the last four years I have watched the progress of the disease with great anxiety, to find out its cause; and I have sought some explanation of it in the various publications that have fallen into my hands; but I still remain much in the dark.

This year I had half an acre of potatoes planted on a very dry, sandy loam; and having read that the disease was attributed to a want of alkali, and that a plentiful supply of manure was the remedy, I applied 20 cart-loads of long manure, mostly from the horse stable. In some parts it lay nearly four inches thick on the ground. At the distance of two miles, I planted four acres on new prairie, broken in the spring. The soil, a rich, dark loam,

The disease attacked both patches about equally. Half the produce was destroyed. The remainder, carefully selected, looks well, has been placed in a roof house, and I have every hope of its continuing good through the winter.

These potatoes grew well, and were fine, healthy-looking plants until the middle of August. About this time we had cold rains for two or three days; after which the weather cleared, and we had three nights so cold as nearly to produce frost. These nights were accompanied by a heavy dew, by some called a honey-dew.

The weather then moderated and became very warm. In four or five days, black spots appeared on the leaves, and about ten days after, the tubers were affected, the first symptoms being a yellowish rust on the coat.

Many persons hereabouts name this "potato rust." Now, I have ascertained by observation, that for the last four years the disease has always commenced as I have described. In one instance, I knew the hauling of a whole field of the black or purple potato killed in this way in one night, having the appearance of being destroyed by a hard frost, when I am positive no frost occurred, only one of the cold, heavy dews. The potatoes stopped growing, but did not rot, and were used all winter.

I am therefore led to the conclusion, that this dreadful disease is caused by the state of the atmosphere, and that some powerful agent, being deposited on the potato, checks the current of alkali then in its progress through the plant, and causes the decay.

I believe that the disease is not so virulent on dry soils as on cold, wet land. I have positive evidence that the disease is not confined to the potato, for the same dews produced the same rust of the leaves on my

tomatoes, cabbages, and rutabagas. The rutabagas all rotted. I have not harvested one. The effect of the dew was most apparent on the tomatoes; the under side, where the dew collected heaviest, being soonest turned black.

I am unable to suggest a remedy; I fear we must wait patiently until a healthy state of the atmosphere permits the dew, supplied to invigorate the vegetable kingdom, to be deposited free from poison.

Some doubt had been expressed as to our growing winter-wheat here; but the past season has removed all question on this head. Crops of it have been raised in several parts of the Territory, and, in all cases that I have heard of, successfully. I have seen very beautiful samples of the grain.

Mr. Eli Pettijohn, on his farm near St. Paul, sowed two bushels of buckwheat, and has cleaned up of the produce one hundred bushels by measure.

We have to acknowledge the receipt, the past season, of a package of garden seeds; from some cause, few of them vegetated. The flower-beans and early emperor peas grew well with me. I divided the whole package, and distributed it in the neighborhood, but have not heard anything further of it.

In my former letter I have spoken of the very favorable nature of the St. Peter's country for a sheep-farmer.

A treaty has been made with the Indians for the purchase of this tract, and it will probably be open to settlement the ensuing spring.

If this communication should meet the eye of any one desirous of raising sheep here, I would suggest that a breed known in the Old Country as the improved Teeswater would be most likely to be profitable and suited to our climate.

Your most obedient servant,

P. PRESCOTT,

Superintendent of Farming for Sioux.

Hon. THOS. EWBANK,

Commissioner of Patents.

OREGON.

UMPQUA VALLEY, OREGON,

December 28, 1851.

SIR: In attempting a reply to your Agricultural Circular for the year 1851, from a land but just emerging from a state of barbarism, where, in the settled portions, the recently and rudely constructed log cabin of the emigrant stands beside the ruder wigwam of the aborigines, it is not expected that a single item will be added to the vast amount of agricultural knowledge collected and disseminated by your Office. But as a sketch of the agriculture of a "new country" may be useful to the farmers of the old and highly cultivated portion of the Union, the better by contrast to appreciate the blessings they derive from civilization, established communities, and the labor of the generations that have preceded them, and also to those who, in disregard of these blessings, desire to make their homes in this far-off country, these remarks are submitted, to be used as you think proper.

As, besides the permanent control which the surface, soil, and climate of a country exercise over its agriculture, other causes—such as markets, means of transportation, and the prices of labor, though in their nature temporary and local—have, while they exist, little less influence, I shall endeavor briefly to show how far they direct the present labors of the farmers of Umpqua.

The basin drained by the Umpqua river lies between 42½ and 43½ degrees of north latitude, is separated from the Pacific ocean and surrounded on all other sides by a high wall of mountains. These mountains are wooded with dense and continuous forests of the evergreen, fir, pine, and cedar; their lofty peaks, steep and narrow ridges, and deep dark chasms, will perhaps forever defy the art of man to bring them into a state of cultivation.

To a person accustomed to the level or gently undulating surface of the western States, the term "valley" appears wholly misapplied to the Umpqua country, as the broad plains and gently-swelling hills associated in their minds with that term are nowhere to be seen. The basin, being very broken, (the narrow valleys lying between ranges of high hills,) appears, when viewed from the mountains that enclose it, to be merely a mass of hills and mountains, differing from its rim in being of less elevation, bald or timbered with oak, the evergreens only appearing in clumps on the loftiest summits or lining the deep ravines.

There are no lakes nor marshes; the waters of the surrounding mountains rush from their dark chasms in many streams that, meandering through the valley, collect at its northwest corner, where the Umpqua river pierces the coast mountains, and finds its way to the ocean.

The soil is lively and rich; that of the valleys, being alluvial deposits from the hills, is a dark, deep loam, in places sandy, and based upon a red clay; the soil on the hills is dark, or light-brown, according to its depth, it being lightest where most elevated or exposed to the action of the water.

Owing to the vicinity of the Pacific ocean, and the prevailing winds along the coast, the winters are warmer and the summers cooler than in corresponding latitudes on the Atlantic side of the continent. While the wind blows from a southerly quarter, which it generally does in winter, the weather is warm and damp, the ground seldom, if ever, freezing hard enough to kill peas or oats, or check the growth of cabbages, turnips, or other hardy plants. The mildness of the winters has a most important bearing upon the agriculture of the country. As an illustration of this fact, I herewith enclose some flowers* which have grown in the open air, and were this day (28th December) plucked from plants common to all parts of the Union, and familiarly known as the hollyhock, marigold, morning bride, sweet William, and grasspink. You will perceive some of them are full-blown, and others just opening, which will show that these plants continue to produce flowers even in midwinter.

But as the winds in summer blow from the opposite quarter, frosts frequently occur, late in the spring and early in the autumn, sufficiently severe to cut down beans, melons, and other plants of that description.

About the 1st June rain generally ceases to fall in sufficient quantities much to benefit a growing crop; and, if it fail to rain about the autumnal

[*The flowers referred to arrived in Washington at a time when the thermometer indicated 20 degrees below the freezing point, or 12 degrees above zero.]

equinox, the drought will continue until about the 1st of November. Though the climate of Oregon is, in this particular, more uniform than that of the western States, it has also its variations; the winter sometimes being, for two or three weeks together, clear and frosty, and cloudy weather and rain sometimes occurring in summer; the present year agrees with the exception nearer than the general rule.

Markets.—Scottsburg, at the head of tide water on the Umpqua river, and twenty-five miles from the ocean, is near the southwest angle, and the shipping point for the valley; above this point the river is not navigable, and as yet there is no road leading to it passable except with horses. But the principal market for the products of the farm is found in the gold mines of the Klamath and Rogue rivers. These mines lie between the 41st and 43d degrees of north latitude, and are principally supplied from Oregon.

Wagons are sometimes used as a means of transportation as far as Shasta city; but, owing to the badness of the roads, pack animals are mainly employed.

Labor, for the summer, is worth from three to five dollars per day, and but few laborers are to be had at these prices. These circumstances, together with its recent and very rapid settlement, controlling the farming operations of this country, rude and primitive as they may appear to farmers in a more advanced condition, are yet in accordance with sound judgment and good policy, and go to show that many of the practices of our ancestors were not so much the results of ignorance as of necessity.

The immigrant arrives late in autumn at the end of an exhausting journey in a wilderness. He has first to direct his attention to the comforts of his family; their subsistence is to be procured, perhaps, from a distance, and they are to be protected from the inclemencies of winter, which is now fast approaching. Whatever his knowledge of architecture, or his ability to avail himself of the labor of others, there are no quarries of stone or kilns of brick ready to furnish material for his walls, nor machinery to prepare the wood for the completion of the edifice. Wealth cannot call these things into existence, nor here secure the services of mechanics to use them, were they to be had; and if without it, which is too often the case, so much heavier is the iron hand of necessity upon him.

Like circumstances, at all times and places, produce like results, and the pioneer here, as elsewhere, erects a log cabin as his first edifice.

The same necessity governs his first efforts in agriculture, and for one or two years there is little attention paid to the culture of anything not needed for his own subsistence. And it must be borne in mind that but few of the settlers are yet prepared to avail themselves of the natural advantages of the country, or to turn their attention exclusively to those branches of agriculture that the markets and means of transportation make most profitable; which subjects I shall now proceed to notice.

Grasses of nutritious quality cover the whole country; that of the hills being varieties of the buck-grass, or festuca, common to all the elevated regions of Oregon. The valleys produce a ranker growth and greater variety, among which may be mentioned a valuable clover. The excellence and abundance of these grasses, which, from the mildness of the climate, continue their growth through the winter, make the country, to all grazing animals, a natural home.

Horses, Cattle, Sheep, and Hogs are free from disease—always in good condition; and beef, mutton, and pork of superior quality are at all seasons slaughtered that never received either food or shelter at the hand of man.

Besides the surface and climate, which must ever mark it as a grazing country, there are many temporary and local causes to encourage the raising of animals at present.

Horses and Mules.—As horses and mules are extensively used in the carrying business, they are in good demand; $100 being about the average price of Indian and Mexican breeds, fit for service; and those of the United States rate much higher—good horses and mules bringing double that rate.

Cattle are also in good demand, as bullocks can carry themselves to market, and gather their food by the way; and butter and cheese are articles in which, with Oregon, no country can compete.

Bullocks, on foot, rate from six to ten cents per pound, the price depending on the tractability of the animal in being herded and driven. Spanish stock, $15 to $25 per head, according to training. Tame cows, with calves, $50 to $100. Butter, 75 cents; cheese, 50 cents per pound.

Sheep are not valued for their wool, though there are now in the country some of the best wool-bearing breeds. The short, sweet grass and pure air of the mountain pastures encourage a remarkable fecundity and fatness in the animal. Young lambs are being added to the flock in every month of the year, and it is not uncommon for a mutton to yield 20 pounds of tallow, while the flesh, for fineness of flavor and texture, is nowhere exceeded. Mutton is a convenient article of food at home, as well as in the mines. Salt provisions being little used, an ordinary family, even in summer, will consume a mutton while it is still sweet and fresh.

Hogs, as yet, succeed well, but it is probable their food will first cease to be produced spontaneously. The mast-bearing trees are few in number and variety; black oak, white oak, and hazel comprising the whole. The clover and nutritious roots of the valleys being their principal dependence, besides their own tendency to destroy, each field put in cultivation directly diminishes their pastures. Their flesh being not much eaten at home, they are mostly made into bacon, and, in that shape, are a valuable item in the trade to the mines. Stock hogs, 8 to 10 cents per pound; pork, fresh, 10 to 12, and bacon, 25 to 50 cents per pound.

Hereafter, when the number of grazing animals approaches more nearly to the capacity of the country to maintain them, the danger which may be apprehended to this branch of business is, that the grasses starting up with the first rains of autumn continue their growth through the winter, and ripen about midsummer, and, except on damp places, remain dry until rain in sufficient quantity again falls to renew its growth. In the dry, or hay state, it is equally nutritious as, perhaps more fattening than, when green, but it is liable to be burnt off; and when such an accident happens, and the rains are late in falling, and are followed, as is sometimes the case, with cold, rainy weather, and even snow, the scarcity produced by the fire will be prolonged through the winter, which must result in a ruinous loss to such farmers as are unprepared to meet it with food for their animals. Such was the case in Willamette in the winters

of 1846-'47 and 1848-'49, in which hundreds of animals perished of starvation.

Crops.—On the dry lands any crop ripening by midsummer succeeds well. Wheat, peas, oats, barley, &c., are cultivated for home consumption; the want of mills and labor-saving machines, and the price of labor, discourage their cultivation as articles of export.

Vegetables—such as maize, potatoes, cabbages, &c., requiring the whole summer to perfect them—will some seasons succeed without irrigation; but, as the crop is liable to be cut short by drought, usually a spot naturally damp, or that can be easily irrigated, is selected for the kitchen garden.

The mode of culture is simple and primitive. The emigrant, who has arrived too late for fall-ploughing, in early spring turns over the green sward of the prairie with a huge, clumsy plough, drawn by oxen. On this he sows his crop of spring wheat, peas, or oats, and harrows it in with a wooden harrow or a scragged tree-top; the first, if a spring crop, yields from 10 to 25 bushels per acre, being varied by the manner and time of setting the crop, and the continuance of the rains. If sufficient rain falls about the autumnal equinox, which is generally the case, fall wheat is sown; but if this should not happen, it creates no uneasiness, as the crop may be set at any time until March without any perceivable difference in the yield, and but little in the time of ripening. It is common, however, to sow more seed on late sowings.

The yield of the fall crop, though affected by the same causes, is more uniform and abundant than that of the spring, and from 20 even to 50 bushels of wheat are harvested per acre. The rotation of crops, though doubtless here of as much advantage as elsewhere, is attended with one serious inconvenience, the frosts of winter being insufficient to destroy peas or oats. Wheat, if following a crop of either, is frequently choked and intermixed with their voluntary growth; and oats particularly are very injurious. The same result also follows in sowing in fall after a spring crop—the two kinds of wheat become intermixed to the injury of both. At the time of harvest, the weather is usually dry and pleasant. Wheat and oats are cut with a cradle, and peas pulled by hand. There being no barns, a clayey spot is made smooth and hard by being dampened and beaten with mauls, or tramped with animals. Around it a high, strong fence is made, and over it those fond of the shade throw a few bushes. On this "floor," the grain is laid regularly, the heads pointing obliquely upward. A wild, skittish band of horses are turned in and driven against the bristling heads of the grain, and, by their scampering, in a very short time the wheat is threshed from the straw, and much of the straw itself broken to pieces, much more time being required to separate and remove it from the grain than is occupied in threshing. Leaving the bottom undisturbed to the last, as it is sometimes dirty, the threshed grain is pushed to the centre, and another floor laid down; and so on until the crop is threshed.

Formerly we depended upon the sea-breeze, which springs up each evening, to separate the wheat from the chaff; but now, as we can obtain fanning-mills at $100 each, most of the farmers are providing themselves with these modern inventions.

Of the whole list of vegetables and fruits found in the temperate zone, there is scarcely one that may not here find its favorite soil, and, with a

little attention, be adapted to the climate; and in the vegetable market, having no foreign competition, the farmers have the greatest encouragement to engage.

In the culture of vegetables, besides damp land or irrigation being necessary for complete success, much advantage is gained by the use of stable manure, not so much to give strength to the soil as to counteract, by its warmth, the cold rains and chill weather of spring. Plants requiring a warm climate do not grow rapidly or have a healthy, thrifty appearance until late in spring; and such tender ones as pepper, beans, melons, &c., are liable to be cut down by frost. But when the sun's rays have overcome the chill, northwest wind, in no country is vegetation more luxuriant or do plants advance more rapidly to maturity or (such as are best adapted to the climate) attain greater size; but, as I have already greatly exceeded the limits I first intended to occupy, I must briefly notice a few only of such vegetables as are in common use.

Potatoes.—Are subject to no disease; grow well both from the potato and the seed of the ball—the growth from the seed requiring a longer time to mature. The yield of the present year was large. My largest potato, from the planting of the root, weighed 5¼ pounds; from the seed, 3¼ pounds. Price, $1 50 per bushel.

Beets, Parsnips, and Carrots.—A fine growth; 4 cents per pound.

Cabbages and Turnips should be sown late, as both mature early, and, if not used, run to seed. Turnips, not being needed for stock, grow too large and pithy for house use. Both vegetables, when the growth of the fall and winter, are much better than the produce of warmer weather. Weight of largest cabbage head, 25 pounds; price, 4 cents per pound. Turnips not sold.

Onions are a most valuable vegetable, as they are in great demand in the mines, and here appear perfectly at home. A damp plat, manured from the cow lot and sown early, is sure to yield a rich return; from the seed, largest weighed two pounds. Price, 10 cents per pound.

Indian Corn and Tobacco do not succeed here as in the southwestern States, owing, I think, to the coolness of the nights. Both are cultivated—tobacco for domestic use, and Indian corn more from attachment to the plant than its value.

Sweet Potatoes have not been introduced, but a suitable kind will, no doubt, succeed. *Squashes* are cultivated as a substitute; the larger kinds sometimes weighing 40 or 50 pounds.

Having shown the adaptation of the Umpqua valley to the purposes of agriculture, and the great encouragement at present given to it by the high price of produce, it may be interesting to farmers of the United States to know the circumstances producing present prices, and the prospect of their continuance.

In regard to present prices, it must be borne in mind that three-fourths of the inhabitants of Umpqua are immigrants of the present year, who must be fed, and furnished with seed—that, within the same time, the newly-discovered mines of the north have attracted between ten and twenty thousand persons, whose supplies are drawn from Oregon principally; and as the roads are bad and transportation expensive, Umpqua, being the nearest farming district to the mines, has had a decided advantage over other parts of the country.

But the very means which have given the farmers of Umpqua great advantages in the market will tend to make them of short duration; because a portion of the country embraced in the northern mines is well adapted to the purposes of cultivation, and much more of it affords fine pasturage.

The grazing in the neighborhood of Shasta city is excellent, and a fine yield of both potatoes and gold may be dug from the same plat of ground; and, as the price for which vegetables, butter, and cheese are sold in the mines, must be enormous, it is a profitable business to pay high prices for them here and carry them 200 or 300 miles on the backs of animals. Many have exchanged the pick and shovel of the miner for the implements of husbandry, and farms and dairies are being established in the very heart of the mines themselves.

The peaceful relations which have at last been established with the Indians of Rogue river will also have their influence, as they have opened to the farmer a valley surrounded by mountains rich in gold, remarkable for its health, beauty, and agricultural capacities; and as the distance from the ports of the Pacific, and the extremely rough and mountainous country lying between, will make transportation always difficult and expensive, the northern mines may shortly be independent of commerce, except for groceries and manufactured articles. When the mines cease to consume the agricultural products of Umpqua, it is difficult to foresee what other market will be found, or what will be the effect upon the pursuits of the inhabitants. The great natural advantages of the country, and the nearness of the market, are overbalanced by the high price of labor, difficulties of transportation, and want of machinery; and, until great changes in the prices of labor and improvements take place in the other obstacles, we cannot compete with Chili and the Atlantic States in the provision trade of the Pacific. These things considered, though there is perhaps not one farmer in a hundred discontented or desirous to exchange his home in Oregon for the one he left in the States, I do not think a greater proportion of the prudent would advise their friends who are well and comfortably settled in the States to exchange the many comforts and advantages they now enjoy, and perform the arduous and dangerous journey over the plains, for the certain privations and uncertain advantages of a home in the wilderness.

Very respectfully, your obedient servant,

JESSE APPLEGATE.

Hon. THOMAS EWBANK,
Commissioner of Patents.

CALIFORNIA.

OPHIR, PLACER COUNTY, CALIFORNIA,
December 3, 1851.

SIR: Having been presented with a copy of the Patent Office Report for 1850 by the Hon. Dr. Gwin, previous to his leaving California for Washington, and as the evenings are now quite lengthy, affording me time to write, read, and reflect, I have just laid aside the aforesaid Report to put on paper a few ideas suggested on reading some of the agri-

cultural letters contained therein; and which, although brief, will convey a pretty good idea of the manner *we* "do things up" here in this land of gold.

The principal product of this State is *gold*—the grand object for which most of mankind are toiling. I have been in California nearly two years, and am more fully convinced, the longer I stay, that its auriferous resources are inexhaustible. I say it as my honest conviction, that the gold, which is interspersed through the soil, hills, mountains, valleys, rivers, and quartz veins, will never be exhausted. It will afford employment for many thousands of people so long as "man exists." Although the spots where the richest deposits are may be worked and worked ten times over, gold will still remain and attract the labor and attention of its seeker.

Let no one be deceived as to the real character of the gold mines of California, nor of the climate, nor of its agricultural advantages.

I observe, in the copy of the Report before me, quite a number of articles on dairies, &c., and the amounts realized from milk, butter, cheese, fowls, eggs, &c. I will state what I have done with two cows and three hens in eight weeks time:

About the 1st of last October, I bought two American cows from a dairyman near Sacramento city—they were fresh, with young calves—for which I paid him, in "gold coin," *four hundred dollars*. (Rather a high price, I think I hear some of your farmer-readers say.) But, now, mark to what account I turned my $400. The cows have averaged 12 quarts of milk, each, per day, which would be 24 quarts. Now, every quart of the milk sold for 50 cents, which in two months would make $720. The cost of keeping the animals for the above time, on hay, corn-meal, and potatoes, (hay selling at $80 per ton, meal $8 per hundred pounds, and potatoes $4 per hundred,) did not exceed $100. I also have some hens, for which I paid $4 each; the eggs of which have averaged $5 for every dozen. I have seen laying-fowls sold within a few weeks at the rate of *seventy-two dollars* per dozen. I was one of a party who dined, on thanksgiving day, (November 27th,) on three common turkeys, for which were paid *thirty-six dollars*. The above are facts, and I think will somewhat astonish many of your readers. One thousand dollars could not buy my two cows, or ten dollars either of my hens.

By the aid of irrigation, the man who has served me with vegetables this season cleared, from about eight acres, not less than $3,000. What think ye, tillers of the soil, of this? Not a pound (for, mark ye, everything is sold by *ounces* and *pounds* here) of all his truck sold for less than 12 cents, and early in the season it brought as high as 30 cents.

For barley, oats, cabbages, pumpkins, radishes, tomatoes, and every variety of vegetables, I think California cannot be excelled by any State in the Union. I have lived on the borders of the Atlantic (being from Philadelphia) and the Pacific, and never saw a parallel. A few specimens from here would make a nice array in some of your horticultural and agricultural exhibitions. As yet, however, comparatively few among our population have turned their attention to agricultural pursuits and the development of our natural resources, except in digging for gold.

But the real advantages are here, and have been lying dormant for ages, and will most assuredly be brought into requisition by the indomitable energy of the American emigrant in a very few years. Let the

farmer from the eastern, middle, and western States immigrate to California. Let him bring along his family, (for this is no place for a man without a helpmate,) and *determine* to make this his home, and he will find this country far better than he even could have pictured it in his imagination; and under his own "vine and fig-tree," and the protection of the "glorious stars and stripes," he will realize his fondest hopes of life, health, fortune, and happiness.

A mighty empire is about to be reared on the shores of the Pacific, and to all who would be its builders I would say, "Now is the appointed hour, and now is the accepted time."

With high consideration, I am, respectfully, yours, &c.,

PHILIP LYNCH.

Hon. THOMAS EWBANK,
Commissioner of Patents.

MOKELUMNE HILL, CALAVERAS COUNTY, CALIFORNIA,
December 16, 1851.

SIR: Mr. J. B. McKennie, postmaster at this place, has put into my hands a Circular from your Office, with a request that I reply to the points named in it.

My observation does not extend far beyond the mineral portion of the country, and in the mineral region but little has been done to develop the agricultural resources which that particular portion of California may possess. Among the hills which constitute the lower range of the Sierra Nevada, are many valleys, through which run streams of water. Those valleys are well adapted to agricultural purposes, and the soil is invariably very productive of grasses and flowers. A few of these valleys have been under cultivation during the past two years, and, at the present time, persons who intend to remain permanently in California are giving much attention to them.

Oats and Barley.—Of grains, oats and barley are the only kinds cultivated, and experiments have been so successful as to render it certain that the soil is well adapted to the production of them.

Clover and Wild Grasses, resembling the "red-top" and "blue-joint" of the Atlantic States, are abundant in all the mountain valleys, and are gathered in such quantities as are required for the use of the cattle employed upon the roads to the mines. Those grasses are heavily seeded, and, when gathered at the proper time, make excellent hay. I have no means of knowing the quantity usually gathered from an acre of ground, but judge it to be equal to the product of well cultivated fields in the Atlantic States. The cost of growing is, of course, nothing. Native hay, in bales, in most of the mining towns, sells from $60 to $100 per ton.

Dairy Husbandry is not pursued as a business in this part of the State.

Neat Cattle, Sheep, and Hogs are raised on the larger farms for the purpose of supplying the miners. They invariably feed upon wild grasses and acorns, no attention being paid to them other than is necessary to prevent their straying.

Horses and Mules, though employed in large numbers, are always brought from the southern part of the State. None are raised in the mining region.

Cotton, Sugar-cane, Rice, Tobacco, and Hemp have never been planted here.

Turnips, Carrots, Beets, &c., are cultivated to considerable extent, the ground receiving no other attention than simple ploughing. The average product of this rude cultivation is, so far as my observation extends, considerably greater than that of the careful cultivation in the States east of the Mississippi river.

Irish Potatoes grow here more luxuriantly than in any of the States east of the Mississippi. No manure is used. No attention is paid to the different varieties, but all grow with thriftiness. The "potato rot" does not affect the crop in California.

Sweet Potatoes grow as thriftily as the Irish potatoes, but they are not much cultivated—the prevailing taste being in favor of the Irish sort.

Fruit.—Nothing has been done in the way of fruit cultivation. The climate and soil are admirably adapted to the raising of grapes, peaches, pears, plums, &c.; but it is not probable that apples would flourish as well as in a colder climate.

Manures.—No fertilizing agents have ever been used on any of the lands cultivated, so far as my observation extends.

Meteorology.—I am not aware that any record of the range of the thermometer has ever been kept here, but have observed in midsummer—say in July and August—a temperature of more than 100 degrees; and should say 96 degrees a fair average for the months of June, July, and August. The 12 hours of night, during those months, are cooler than the hours of day-time by 15 or 20 degrees. For the winter months, 65 degrees would probably be near the average of the day hours, and 55 degrees of the night hours.

During the "dry season," which commences in April or May, and closes in October or November, it is seldom that any rain falls. In the summer of 1849 we had slight showers in August; in 1850, a drizzly rain in September, which continued three days; and in 1851, two slight showers in September—no other rains falling during the last three dry seasons. During the month of January, 1850, J. E. P. Weeks, a resident of this place, kept a record of the number of rainy days in the month. This record he compared with a similar one kept at Boston, and found that in the month of January about as much rain fell here as in June in Boston during the same year. That year much less rain fell than the year before; and up to the present time this year, we have had less rainy weather than last.

General Remarks.—About a sixteenth or twentieth part of all the land, from the foot-hills of the Sierra Nevada to a range 20 miles nearer the summit, can be cultivated to good advantage, and will produce, without irrigation, one crop a year of small grains or roots. The character of the arable land is alluvial, being the earthy and vegetable matter that is washed from the neighboring hills. It is covered, during the rainy season, with rank grasses and wild flowers, which ripen as the dry season approaches. As no rain falls after the dry season has once commenced, the vegetation becomes parched; the different seeds fall to the ground; and thus are reproduced those flowers and weeds which grow from seeds. Much of

the vegetation, thus ripened and dried, affords good food for neat cattle and horses; so that, though no grass grows in summer, cattle will thrive through the year in the open field.

The mines in the neighborhood of the valleys afford a ready market for the products of the soil, at prices ranging much higher than are obtained in the Atlantic States. The yearly crops, when irrigation is not used, should be raised in winter; but when there are facilities for moistening the lands by artificial means, a crop may be raised at any season.

I have the honor to be, most respectfully, your obedient servant,

GEORGE H. CAMPBELL.

NEW MEXICO.

EXECUTIVE DEPARTMENT, SANTA FE, NEW MEXICO,
January 30, 1852.

SIR: I have the honor to enclose to you a communication from Dr. J. F. Hammond, of the United States army, in reply to your "Agricultural Circular." Although quite a young man, Dr. Hammond is favorably distinguished by those who know him of riper years.

With great respect, I am your obedient servant,

J. S. CALHOUN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

FORT FILLMORE, NEW MEXICO, *October* 16, 1851.

SIR: The following replies to the questions in the "Agricultural Circular" of the United States Commissioner of Patents in August last, and forwarded to me by yourself, apply to Socorro, in north latitude 34° 2′ 39″, and longitude 7h. 7m. 54s. west from Greenwich, and less than 4,500 feet in altitude above the sea, and to Doña Ana, in north latitude 32° 23′ 61″, longitude 107° 1′ 55″ west from Greenwich, and about 3,000 feet above the level of the sea.

The land is river-bottom on the Rio Grande del Norte, with very little vegetation upon it, and containing a very large proportion of chloride of sodium, nitrate of potassa, and sulphate and carbonate of lime.

Wheat.—Guano is unknown here. The product is never estimated by the acre, but by the quantity of seed sown. The average product to the bushel planted is 75 to 100 bushels. It is planted generally at Socorro, about the middle of January; though it is better when planted in the fall—is more hardy, fills better, and matures earlier. The depredations of the animals prevent the latter season being universally chosen. There are no fences nor ditches for protection, and the animals, though under the care of a herder, stray at liberty during the winter. At neither place is there any preparation of the seed for planting, and the quantity used per acre is about half that used in the United States. The land is broken, and the seed planted at the same time by drilling, and is never ploughed a second time. Time of harvesting is August. The plough used is the conical-pointed Mexican plough, generally pointed with iron.

It runs about three inches deep. The American plough is found to yield more, but its costliness prevents its being adopted. The yield is neither increasing nor diminishing. The land is watered by irrigation, which renews it. There is no system of rotation of crops; no Hessian flies nor weevils. The average price is $2 per bushel.

Corn.—The manure employed is ordure from goats, sheep, horses, and cattle. At Socorro from five to twenty-five bushels per acre are scattered over the field in February. The ground, for corn, is broken at the same time. They sow wheat in January, and early in April furrows are run, all in the same direction, and about six feet apart, and the corn is dropped, by the eye, at intervals of about six feet. Five or six grains are put in a hill, and give 15 or 16 stalks. It is never *suckered*, and the suckers yield as well as the main stalk. The corn is usually ploughed once, and hoed twice. The land is irrigated just before running the rows for planting, and the corn is watered from one to four or five times, according to necessity and the general demand for water. The average product is 45 to 75 bushels to the acre. At Doña Ana manure is not used. The corn is dropped, or drilled, and hoed out to 15 stalks in the hill; the hills six by six feet apart. It is rarely ploughed even once after planting, at either place, and never in more than one direction. The average product is 75 to 100 bushels to the acre. The greatest labor expended on the crop is in irrigating, exclusive of the expense of digging the *acequias*, or aqueducts. Numerous small dams are thrown up over the fields, furrowing little squares, and all connected to retain and guide the water in its flow. Land rents at Socorro for $5 per acre. The wages of a peon are $4 per month and his provisions; clothing, housing, and doctor's bills not furnished; and the days he does not work are deducted. From the system of planting by irrigation, four peons are required to do the work of one negro in the United States. The farmers commence to gather their corn, by order of the alcalde, all on the same day, and gather day and night; and, by a similar order, the animals are turned upon the fields all the same day. Corn is never fed to animals. Manure from hogs is never employed.

Oats, Barley, Rye, Peas, and Beans.—The two first yield largely; they have been planted only in small quantities, from want of seed. No rye or peas, except the English garden pea. The garden or English pea is sown broadcast, and yields much less than in the gardens of the United States. Beans (*frijoles*) yield 35 to 45 bushels to the acre; they are, in planting, dropped irregularly, about the same proportion to the acre as in the United States; are planted alone in the ground, or with corn half way between the hills. The land is renewed by the sediment deposited from the water of irrigation. Peas are never planted as a renovating crop.

Clover and Grasses.—Clover has been planted in but one instance, probably, in the Territory; the yield was enormous. Of the grasses all are wild; one ton may be cut to the acre in the bottoms. All the meadows are natural; none laid down. The grass upon the hills is preferred; it is called *grama* by the natives, and remains green during the winter. The stock all subsist upon it during the winter, and chiefly in the summer. It yields much less to the acre.

Dairy Husbandry.—Butter is not made nor used by the natives. The yield from the cow's milk is large. The milk of the goat, cow, and

sheep is equally in use for drinking and for making cheese. That of the cow and sheep is equally esteemed for drinking; that of the goat less, and is prepared by salting and boiling, and is eaten with mush. The cheese is precipitated from the milk by means of the stomach of the sheep. The stomach is prepared by covering it with whey, to which is added a handful of common salt. After this has remained together in a vessel for a day, the milk is added; the casein (curd) is precipitated immediately; is removed and pressed between small boards; and is offered for sale in circular cakes, 4 inches in diameter, and from 1 to 2½ inches thick. It is made for immediate use, and is rarely seen more than a few days old. It is eaten with sugar.

Neat Cattle.—Cost of rearing until 3 years old is not over half per cent. per annum on the value of the animal; at that age they are worth $20 to $25 per head. Cows for the dairy are worth $40, but may be hired for the year at $1 per month. Varieties in the breeds are never heard of. Steers are broken for the yoke by lashing the yoke to the horns behind them, by means of a rawhide thong; from the yoke trails down between the steers and upon the ground a long, heavy log; and they are goaded by a long, sharp-pointed stick, until they are accustomed to the yoke, and learn the words of command. Like all the other domestic animals, they are bred as tame as dogs.

Horses and Mules.—The growing of them would be profitable, if it were not for the Indians; the expense of raising them is not one per cent. The brood mares are used, with foal or not, the same as other horses. They are taught to bear burdens (children) from the earliest age.

Sheep and Wool.—There is little or no demand for wool, and it is coarse; it is worth 4 to 10 cents per pound; is used for making a coarse kind of blanket called *serape*, and of carpeting called *jerga*, and for mattresses and pillows. The materials for clothing are now obtained from the United States. There is but one variety of sheep observed; it is small, and the meat of fine flavor. The average yield by lambs is 100 per cent.; the cost of raising sheep two per cent. per annum; and their yield 80 per cent.

Hogs are rarely seen; of a small variety, and worth from $15 to $50. The absence of mast prevents their being raised for market, or to obtain bacon. Bacon and hams are almost entirely unknown by the natives; a little is brought from Mexico, and never cured among them.

Cotton is never seen here.

Sugar-cane is unknown here; yet at Socorro, molasses is made from the green stalks of the maize, common in the country.

Rice is not planted. It might be raised on the damp bottoms. Upland is too dry and stiff for it.

Tobacco.—A species of tobacco, with a round leaf, five inches in diameter, and the stalk rising to the height of six feet, is raised. The seed is planted in a small spot of ground; the plants are set about two feet apart; the leaves are picked off when green, before the plant goes to seed, and dried and formed into small bundles. It is called *punche;* is mild, and has a pleasant flavor; raised chiefly for family use. Cannot estimate the production. Is never planted in reference to any other crop.

Hemp is unknown.

Root Crops.—Turnips, carrots, beets, onions, and garlic yield enormously. The onions are the large white onions, and cannot be excelled.

The other roots have been planted in such small quantities that the yield and cost of production cannot be estimated. The beet grows to a *very* large size at Doña Ana, and at San Elizario, 60 miles further south.

Potatoes.—The Irish yields nothing but weeds, which are very luxuriant. The sweet potato is never planted.

Fruit Culture.—Very little attention is given to the cultivation of fruit, other than the grape. Peach and apple trees are planted or set out, with intervals between them of 15 or 20 feet, forming small orchards; but the trees are never trimmed, and the fruit is rarely allowed to remain on the trees until it is ripe. Apple trees, however, are not found below Limitar, nor above El Paso del Norte. The apples brought from them are small and sweet, and may be kept fresh, it is said, all the year. The trees yield well, and it might be made a profitable crop. No disease of any fruit tree is observed. Budding and grafting are unknown; and I have never heard of any instance of transplanting except of the grape. The grape-vine grows in the form of a bush; is bare of branches for two to two and a half feet, and rarely attains a height above three and a half to four feet. It is propagated by transplanting roots, and by cuttings. Either is buried in the ground six feet apart. At the end of two years the first bears grapes; the second at the end of three years. In October, at Socorro, the dirt is drawn up on the roots, and against the main stem, until it nearly reaches the branches. About the 1st of March it is drawn away from the roots—not baring them—and formed into drains from 15 to 20 feet in length, for irrigation. As soon as this is accomplished, the vines are pruned; removing all the dead branches, and, cutting off all the young branches of the preceding year a few inches from their origin, the vines have no other support than the main stem. One bush will yield annually about half a gallon of brandy—*aguardiente*. Two years ago a vineyard could be bought for 50 cents per bush; now they are worth $1. The removal of the dirt from the roots may be so timed as to delay the budding of the crop, and thus save it from the late frosts. They are never embanked at Doña Ana. At Socorro the bunches of grapes are picked, about the middle of September, for brandy; they are placed in the shade for four days, then tread and pressed by the bare feet upon a leathern sieve; the juice and skins run into a raw-hide vat, where they remain for 18 to 25 days, when the brandy is distilled and put away, uncolored, in earthen jars. The grapes for wine are allowed to remain on the vines until fully ripe, when they are picked, put away for four days in the shade, and tread out in the same manner by the feet; the husks are separated from the must, and the last is boiled, placed in raw-hide vats, the mouths of which are closed by dirt, supported on strips of wood. When fermentation ceases, the wine is drawn off and stored away in casks or porous earthen jars. The brandy, or *aguardiente*, is colorless. The wines are red, sweet, and acidulous. The former is called *vino arropado*, the last *vino blanco*. There are two varieties of grape—the muscatel and the black grape. The first is white, and is esteemed the most. The finest wine is made by *selecting* the best bunches of muscatel, and picking from them the finest and ripest grapes, which are pressed without the stems.

Forest Culture is unheard of, though they are careful of the few sparse groves of cotton-wood that skirt the river, and use it for all mechanical purposes, as well as for fuel.

Manures.—Lime and plaster are never used for manure; the soil is full of salts, and requires vegetable matter.

Meteorology.—At Socorro, 1850, thermometer, F., max. 104°, June 20; min. 1°, December 6.

Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
Dec. 62	1	30.29	Mar. 76	22	49.20	June 104	45	73.23	Sep. 99	53	75.8
Jan. 62	12	42.3	Apr. 85	32	56.8	July 102	59	81.7	Oct. 89	39	65.5
Feb. 68	13	42.7	May 95	30	63.10	Aug. 103	63	67.20	Nov. 69	21	44.13

Winter.			Spring.			Summer.			Autumn.		
Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
64	8	38	85.1	28	56.1	103	55.2	77	85.2	37.2	61.1

Annual.—Maximum, 59.1; minimum, 32.1; mean, 64.2.

Fall of rain or snow.

Dec. .44		Mar. .06		June .17		Sept. .24	
Jan. .00	.96	Apr. .42	.60	July 1.29	2	Oct. 1.81	2.97
Feb. .52		May .12		Aug. .54		Nov. .92	

Annual.—6.53 inches.

More has fallen in 1851, but not double the quantity.

The following vegetables are dried here; and, when cooked a year after, are as fresh as when they were picked:

Tomato, picked ripe, split open, and dried in the sun.

English Pea, picked green, placed on dirt floors, dried in the shade.

Snap Bean, picked green, steeped in warm water, placed on planks in the sun to dry.

Squash, picked green, cut in slices, dried on planks in the sun.

Parsley, picked green, steeped in warm water, hung up and dried in the sun.

Very good raisins, though small, are made by drying the grapes on the bunches hung up in the house.

This is a sketch of the customs of the farmers in this country, in an agricultural point of view, and can give to the Commissioner very little information valuable to agriculture. This is peculiarly a grazing country, and one of the finest perhaps in the world. The natives, until the United States troops came here, planted barely sufficient for their individual use, and they plant very little more now, though the love of silver has induced them to afford sufficient to subsist the troops. Yet the lands are rich, and, could they be irrigated so as not to require the working of the crop to be suspended, would yield extraordinarily. It will show, however, in a slight degree, that the people are primitive and ignorant; and anything that will tend to throw influence in the way to give them

intelligence, will tend to improve agriculture and every other art here. They need first to be taught to read and write, and then the free circulation of every means of conveying intelligence, especially newspapers and journals.

Very respectfully, your obedient servant,

J. F. HAMMOND.

His Excellency J. S. CALHOUN,
Santa Fé, New Mexico.

EXECUTIVE DEPARTMENT, SANTE FE, NEW MEXICO,
January 30, 1852.

SIR: I have the honor to enclose to you the accompanying communication in response to a Circular of yours, asking for useful information. General Baird, the writer of the communication, is one of the most useful, intelligent, and reliable men in the Territory.

With great respect, your obedient servant,

J. S. CALHOUN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

ALBUQUERQUE, NEW MEXICO,
November 10, 1851.

SIR: I had the honor to receive your letter of the 6th October, enclosing a Circular from the Commissioner of Patents, requesting information on a variety of points connected with the interesting and important subject of agriculture. I must plead a press of business in getting in the present crop, and other affairs, as an excuse for this long delay in answering you.

You are aware that we have none but mud fences in this country, and but few of those; so that we have to labor without ceasing, when the alcalde gives the order to gather corn, lest we be left behind and have our corn destroyed by the stock, when turned loose without tenders. Next year some of us, I trust, will be relieved from this inconvenience, as we intend to have our lands enclosed by means of ditches and walls, (timber, you know, in the Rio Abajo, is quite out of the question.) I have never seen a field of corn in this Territory well matured before it was gathered. This results from two faults: in the first place, we are compelled (at least, find it preferable) to wait until the strong winds of the spring cease before we plant corn, as they are extremely detrimental to vegetation; and, in the second place, we are always hurried in gathering in the fall. You are aware of the fact that we are dependent upon irrigation; for which purpose, however, the Del Norte, with proper industry, affords every facility. This would seem, at the first view, to render all seasons for cropping equal; but such is not the case. I find, even with my short experience in this country, that irrigation but partially supplies the place of rain. When showers fall copiously during the time that wheat and corn are growing, they afford a much better yield, notwithstanding abundant irrigation. I was at a loss to account for this, until I examined an excellent treatise on agricultural chemistry,

in which I found that the food of plants derived from the atmosphere is, perhaps, greater than that derived from the soil, and that the fall of rain is necessary to bring down those chemical ingredients that enter so largely into the composition of vegetation, both by the root and the foliage. The last four years, I am informed by the citizens, have been excessively dry during the farming season. The close of the present season, about the time corn was filling, was more favorable; we had an abundance of rain; corn-crops were fine. I must further premise that my experience in this country is quite limited, having spent but one entire year here, and that I labor under many inconveniences, such as the want of implements of husbandry, and a variety of seeds of approved classes. The corn of this country seems to be of a primitive character, and the ploughs equally so. My own actual operations have been confined to a garden and vineyard. I find that all vegetables adapted to the climate grow well; and have succeeded in saving a tolerable variety of seeds for the next year, which (being fresh) will be more likely to germinate than those procured from seed-stores in the States, as they generally send us those the sprouting of which has been for some years barred by the statute of limitations; hence I promise you for the next year a more satisfactory account. Again, lands here are not measured with even an attempt at accuracy. They sometimes buy and sell merely the privilege of the water for a certain number of hours in the day, or days in the week, as the case may be, without much regard to the quality of the land. When they measure at all, it is done merely by a certain number of *varas* fronting the *acequia* (or ditch) for watering, and may run back *ad infinitum;* hence I can give no data better than guesswork, for the present, as to the yield per acre. Agriculture here is confined to wheat, corn, beans, some inferior classes of peas, pepper, onions, and grapes. There is nothing raised for export.

I will now cease rambling over this subject, and answer such questions contained in the Circular as may have any application to this country, further apprizing you that my farm lands, this year, have been rented and cultivated after the manner of the country.

Wheat.—Guano is not used here at all. The only means used for fertilizing is that of irrigation, and answers a valuable purpose. I do not know whether or not gypsum would be beneficial to this soil. If it would, and I so find it in experiments that I intend to make, it will well nigh supersede the use of all other means of fertilization, except irrigation, as there is, quite convenient, an inexhaustible abundance, the use of which is unknown. I am, however, of opinion, that decayed vegetable mould is more wanting than anything else. Crops are always gathered very clean, and the land pastured until it is bare, and never fallowed. But the greatest difficulty we have to contend with is what is here called the *salita*, which seems to be a compound of earthy salts. If some practicable means of destroying or neutralizing these salts could be devised, thousands of acres of land would be reclaimed and brought into cultivation. The average product per acre I cannot give, as lands are not measured by the acre; but wheat, taking the two extremes dependent on the manner of cultivation, will produce from thirty-six to fifty-fold. The time of sowing is February and March; and the time of harvesting, the latter part of July and first of August. There is no preparation of the seed more than threshing and cleaning in the wind. Our wheat is

not mixed with cockle, cheat, rape, tares, or any other noxious weed bearing grain. They generally sow wheat here much thinner than in other parts of the State—I would say something less than a bushel to the acre. Many plough but once; others twice. The ordinary ploughing is a mere scratching of the surface with the rude plough of the country. The yield, I presume, has been stationary from the earliest settlement of the country. The rotation in crops is corn and wheat alternately. I have seen no Hessian fly or weevils in this country, and perhaps the fly might be gotten rid of in the States by the general introduction of seed from this country, as there is no fly here, and as the straw is much harder than any known in the States, being so brittle that we cannot bind our wheat with it. The average price of wheat is $4 per *fanega*, (1½ bushel.)

Corn.—I can give nothing definite as to the product per acre, but suppose it will range between 30 and 50 bushels. The cost of production I cannot give. Labor by the day can be had at 3 or 4 bits; by the month at from $4 to $20. There is but one system known to this country—that is by means of the rude plough alluded to, the hoe, and irrigation. With good turning-ploughs for the purpose of fallowing, common shovel-ploughs for stirring the earth, and cultivating harrows to place the surface in a condition for irrigation, the tillage of corn would be much improved. By fallowing after harvest, decomposed vegetable matter would be supplied, and the land would be left in a good condition for planting in the spring, without rebreaking. We would first water in the spring, then run deep furrows and plant, cultivate with shovel-ploughs until the corn is about half-leg high, harrow down the surface, and irrigate; and so on in rotation.

Oats, Barley, and Rye, are not cultivated here to any extent. *Peas and beans* are cultivated to a considerable extent; but of the yield per acre I am ignorant. Peas are not cultivated as a renovating crop.

Clover and Grasses.—There is no grass cultivated here. I am of opinion that Lucern and herdsgrass, or red-top, would be the best for this country for meadow.

Dairy Husbandry.—This is a term unknown among us. There is some cheese made from goat milk; butter, none. I have but few milch cows, and they yield but little milk, owing to the unnutritious character of the grass in the river bottom.

Neat Cattle.—The depredations of the surrounding Indians have nearly drained the country of all kinds of cattle, and stopped the rearing of others. If we had efficient protection from Indians, the rearing of cattle and animals of any graminivorous kind would cost comparatively nothing. This is really the natural resource of the country; and the salubrity of the atmosphere, with the rich pasturage that can be had at all seasons, if it were safe, renders this country capable of producing and sustaining animal life and health to an extent perhaps unknown to any other land. And a little aid from agriculture, and from the Patent Office, in the supply of suggestions in the Annual Reports, and choice seeds, which could be sent by mail or by the quartermaster's department, would soon make New Mexico the Goshen of North America. Native cattle stand the winters here much better than those brought in; and hence we should improve the native stock by introducing breeders for the purpose of crossing, not superseding. The mode of breaking oxen

and horses, though different in detail, is the same in principle; that is, first to break the animal's spirit or neck. But with regard to oxen: The rope, or lariat, is thrown over the animal's head, horns, or neck. He is made fast, and then the yoke, with tugs of raw hide, is bound to the horns, the usual way of yoking; and then a log is connected with the yoke. The breakers, then, with goads, (poles some ten feet long,) commence torturing and goading the animals until they are run down and their spirits broken. This operation is accompanied by whoops and yells of a hideous character, resembling the wild Indian war-whoop, the barking of dogs, the shouting of women, and the bellowing of the tortured animals; every period being wound up by the household word *carajo*. I have never heard of a failure in breaking oxen in this country. Oxen are worth from $40 to $50 per yoke.

Horses and Mules.—The growing of these animals would be very profitable if we had protection against Indians. The expense of rearing a colt to three years old would be trifling. Brood mares and colts should be treated to good pasture without corn, and permitted to run loose. The Navajo horses are the best in the world, which I presume is the result of their fine pasturage, healthy and temperate climate, and the general treatment they receive, similar to that of the Arabs. The best method of gentling a horse is by means of kind treatment, with a sufficiency of force at all times to let him know you are master. The method used in this country is exclusively force. By this means an animal may be subdued, but he can never be made your friend. The Spanish bit and Spanish saddle are great improvements on the American patterns; and, with them, it is next to impossible for the horse or mule to throw his rider. For the harness, gentle means should be used, and great precaution that the animal receives no fright from his trappings, for it will last him through life; and wherever the same thing happens to him again, he will again be frightened; and if he succeeded in running away the first time, he will try it the second. A team once ran away with me, and forever afterwards one of the horses, notorious for his tricks, tried to do the same thing over when he passed that place; which is proof conclusive that he had memory. I once knew a dog that was caught, when young, in a steel-trap by the toe; and forever afterwards he would become furious when you would show him the steel-trap. Hence, animals can recollect and reward kindness as well as avenge their wrongs. One thing is certain, that no animal should ever be struck for any purpose other than to put it in motion; and then never forward of the shoulder. By a judicious, kind course of treatment, all domestic animals, of ordinary disposition, will soon become pets, and really conceive an affection for their masters, and will do anything for them that they can be made to understand as being their master's desire. We should, at all events, recollect that animals were given to us through kindness, and we should cause them no more pain than is absolutely necessary. The suffering of domestic animals in the California emigration has been immense, and has created a moral accountability that the gold recovered will never answer.

Sheep and Wool.—Wool-growing is not regarded as profitable here; but a small proportion of sheep are ever shorn of their fleeces, for these reasons: the wool is very coarse; the domestic consumption does not bear the proportion of one-tenth to the amount produced; and the high

cost of transportation does not seem to justify the exportation; at least people act as though they thought so. Wool-growing, then, may be said to cost nothing here but the shearing, as the sheep are raised for food, and the wool follows as a matter of course. The price of wool here is from three to five cents per pound. Transportation, as back freight, might be had perhaps at five cents—making ten cents. I suppose it might be sold in the States for twenty cents—making a profit over all cost of 100 per cent. Then, if this be correct, wool-growing would be profitable here. There is no doubt but that the climate, soil, pasturage, and surface of the country are as well adapted to sheep and wool-growing as any on the globe; and by introducing choice breeds of sheep, wool might soon be made the staple of the country. I believe the calculation here is, that, counting all contingencies with good shepherds, (except Indian robberies,) the stock of sheep will double every year.

Hogs.—This animal is not raised here to any extent.

Cotton not cultivated.

Sugar-cane not cultivated.

Rice not cultivated.

Tobacco not cultivated.

Hemp not cultivated.

Root Crops.—Turnips, carrots, beets, &c., not known to the natives. But, from limited experiments, I am satisfied they will all grow well—better than ordinary.

Potatoes, (Irish and Sweet.)—The former cultivated to a limited extent, and in some parts, and in some seasons, produce well; but for the last two years there seem to have been failures throughout the Territory; which, I am inclined to think, is for the want of a renewal in the seed. The Irish potato grows in many places in its native wildness; but it is small. No doubt some excellent kinds could be produced by cultivation. The sweet potato is not raised here—for what cause I know not; it is said to grow finely at El Paso; but it is not cultivated there, because the people invariably rob the hills before the potatoes are matured. Whether any such reason originally discouraged the cultivation of that fine esculent in these parts, tradition does not say; but it is left as a case of "*quizas, quien sabe?*"

Fruit Culture.—There is, comparatively, but little fruit raised here. We have but one kind of apples—a small, white, sweet apple. There are peaches of an excellent quality; and these fruits might be raised with great success. The grape-vine is cultivated here to some extent, and a good quantity of wine made; but not enough to supply the demand, as they are constantly bringing wine from El Paso and the States. The climate, I apprehend, is unsurpassed for the cultivation of the vine. I have never heard of a failure in the crop. But the cultivation of the vine, as well as the making of wine, are in their primitive state.

Manures.—This is a thing but little thought of; and perhaps irrigation has rendered it, to a great extent, useless. Manures are very hard to make, in consequence of the aridity of the atmosphere, and it cannot be done successfully without pits.

Meteorology.—I have made no observations of this character, more than, in the spring there are terrible winds, and in the summer terrible hails, and during the winter, in the mountains, terrible snows; and, take it altogether, it is a terribly dry country.

I have, no doubt, wearied your Excellency, if you have read this all through; but that was not my object, I assure you: it was to call some attention from some quarter to the state of agriculture in this country; and for that purpose, I have endeavored to be somewhat explicit on all points having any application to this region; in order that it might be generally known how we live, and what we live upon. I am of opinion, however, if the government will either whip the Indians, or send us arms and ammunition, and a license permitting us to do it ourselves, that every other good thing of which the country is capable will follow. We are also laboring at present under that depression of morality and industry that a war always leaves in its wake; but we are gradually improving.

I am, with sentiments of high consideration, yours, &c.,

S. M. BAIRD.

Hon. J. S. CALHOUN,
Governor of New Mexico.

EXECUTIVE DEPARTMENT, SANTA FE, NEW MEXICO,
January 30, 1852.

SIR: At my request my friend, General Manual Alvarez, prepared the accompanying letter in response to your "Agricultural Circular." General Alvarez is a native of Spain, and has been a resident of this Territory for nearly thirty years, and no one here or elsewhere has a higher repute for probity and general intelligence; and if any useful information can go from this Territory upon the subject on which he has written, I am inclined to the opinion you will find it in the letter which I now forward to you.

With great respect, your obedient servant,

J. S. CALHOUN.

Hon. THOMAS EWBANK,
Commissioner of Patents.

SANTA FE, *October* 22, 1841.

SIR: In obedience to the note of your excellency, of the present month, relative to the answers that you desire me to give to the Agricultural Circular of the Commissioner of Patents of the United States, I subjoin, in conformity therewith, what I myself know respecting the same particulars, and the facts that I have been able to ascertain since the receipt of your said very valuable note.

With which I remain, most respectfully, your very obedient and sincere servant,

MAN'L ALVAREZ.

His Excellency J. S. CALHOUN,
Governor of New Mexico.

SANTA FE, NEW MEXICO,
October, 1851.

SIR: Before answering any of the questions contained in your Circular on Agriculture, I have thought proper to preface:

That New Mexico, being in one of the highest portions of North America, enjoys an atmosphere of which the air is sufficiently rarified to absorb quickly the humidity which is found on its surface; and that, owing to this circumstance, and to its soil being generally stony and sandy, the waters that flow from its mountains sink at a short distance from their entrance into the valleys and banks of the rivers.

That to these same causes is to be ascribed the fact that the grass which grows and is found during the whole year on its mountains and level plains (*and which is always in proportion to the quantity of snow which falls in winter and to the spring rains*) constantly seasons itself, and that it preserves from one season to another the nutritive substance which nourishes wild and domestic animals throughout the whole Territory all the year round.

That it is also owing to these circumstances that all plants cultivated by man in this Territory ought to be grown where running water reaches, as only irrigated land preserves its fertility.

To all this is ascribed the belief that New Mexico will never be an important country for the production of cereals for exportation, even supposing that easy and cheap means could be found for conveying them to foreign parts.

So also, it is believed, for the reasons already stated, that, as soon as some security can be given here to property and estates, these will increase in great number, and produce not only articles of sustenance for the country, but also for exportation, as some have always been, and increase their wealth by diminishing the expense of their maintenance in all seasons of the year.

Guano is not known in this country.

Wheat.—Wheat is sown during the month of April, and is harvested from the end of July to the end of August. One fanega (a hundred weight measure) is allotted to every acre, and this quantity of seed and land yields, one year with another, 20 fanegas.

No preparation is here made for sowing. The plough only penetrates from two-and-a-half to three inches. As the lands only yield when irrigated, this, often repeated, and performed frequently by careless persons, causes the soil to become impoverished and lessens the crops.

To sow wheat, the earth is first irrigated, after which, when it has taken root, it is again watered; this is further repeated in 15 days, and also as soon as it appears in flower. It is the custom here to sow wheat and corn alternately. These are the only important facts of what can be here called general crops. It is thought that irrigation in the autumn is one of the best remedies against most of the insects that injure cultivation; however, this is little practised.

The price of grain and flour this year (1851) has been higher than at any time these 30 years, in this part. In Santa Fé, wheat flour sold by the hundred weight for $12, and the fanega of corn the same. Previous to the arrival of General Kearney, the price of these articles had only varied from 3 to 6 per cent. the *fanega*.

It must be observed that wheat, whether measured by the *half fanega* or the *almud*, is in either case measured even; whereas, corn, in the same measures, is heaped up; and that the flour of both grains is always measured heaping.

The weight of an almud of wheat flour rarely exceeds 11 pounds, or at the rate of 132 pounds the fanega. Although in commerce the almud of wheat flour and of cornmeal is now received at the rate of 12 pounds, or 144 pounds the fanega, the fact is that wheat seldom weighs *more* than 132 pounds the fanega, and corn seldom *less* than 164 pounds. The fanega of wheat gives little more than 10 almuds of corn heaping, while that of corn gives sometimes 15, or about that.

Corn, or Maize.—Every almud of this seed is sown in the same space of ground that a fanega of sown wheat would require—say an acre; and this generally yields about 21 fanegas.

To sow maize, the soil is watered in the beginning of May; afterwards, it is stirred up when the plant has three or four ears; then it is watered towards the 20th of June, for turning it up with oxen; and is again watered when the sprigs begin to loosen the ear.

Maize is usually employed as flour for human food and as raw grain for animals. The manuring of land is not much practised; and, when it is, it is done with the droppings of goats, neat cattle, and horses, which are taken from the yards where they are enclosed at night. Always, or nearly always, the land is manured a short time before sowing in the spring; however, as manuring is little attended to here, no one can give, at present, the result of increased production from this cause.

Beans and Peas.—These two seeds are cultivated, to some extent, in some parts of the Territory, after a crop of maize or wheat, as much for a change of soil as because they are both articles of consumption for general use. It has not been observed that the soil thus varied deteriorates faster than with other seeds. These two seeds are sown and cultivated both in the same way; and, in former years, I have known two almuds of beans, *(frijoles,)* sown in about one-half an acre of good soil, to produce two and a half *fanegas* when gathered.

Barley.—This is treated here like wheat, and is cultivated in the same way; but oats and rye are scarcely known to us.

Grass.—The only grass known in this country is that which grows spontaneously, and which the poor are wont to bring down in carts from the mountains and marshes to sell to travellers, &c. Neat cattle, and horses that are kept in barns, are fed with wheat and corn-stalks.

Neat Cattle.—These are raised with no further expense than the wages of the herdsman who takes care of them, and his board. The pay of a herdsman is now $6 per month.

Farmers generally prefer the breed imported by the Spaniards, as more vigorous and better able to withstand the severities of the winter. Their price, after they become three years old, varies at the present time from $25 to $30.

The raising of cattle would be very profitable were it not for the continual robberies committed by the Indian hordes that infest the Territory.

Horses and Mules.—The only cost of rearing horses and mules is the services of a man to look after them in the fields where they run loose, once in a fortnight, or oftener, according to circumstances.

The raising of these animals would be very profitable were it not for their being so much exposed to be stolen by savages, as well as domestic enemies. The price of working creole mules varies now from $40 to $50.

Sheep.—The raising of sheep would be perhaps the most lucrative speculation in the country were it not for the danger of savage enemies; because, as I said above respecting other animals, they sustain themselves on what grows spontaneously from the soil.

This country enjoys a variety of temperature very convenient for summering and wintering them; and if the breed of merino sheep were introduced, it is thought that it would not only be preserved pure, but even improved, being productive for its wool, as well as for its meat, which is much esteemed where it is found. They should be managed as is done in Spain, where they are driven to pasture every spring and fall.

The net weight of the breed of sheep that we now have, when 12 or 15 months old, is about 30 pounds. The fleece is then estimated to weigh some 14 ounces. The sheep, at that age, are now valued at $2; and the wool, at the time of shearing, at 6 cents the pound.

Hogs.—The swine that are found here are not of the first quality, as they are a mixture of those possessed by creoles and of those brought from Missouri 12 years ago. From the month of April until towards the end of October they are kept enclosed and fed; after which they are turned loose, and live on what they find. When they are about a year old, they are fattened, which is done by giving them three fanegas of maize. They usually weigh 150 pounds, and upwards.

Cotton, Sugar-cane, Rice, and Hemp.—These are not cultivated in this country; nor is it thought that they would prove profitable, even if nature allowed it.

Tobacco.—A species of tobacco of an inferior quality is cultivated. Missouri tobacco seed has been sown here; but in a couple of years it becomes like the native seed of the soil. This is considered an unprofitable crop, and is little cultivated.

Carrots, Beets, &c.—These grow here very well, but their culture is so recent that it cannot yet be determined whether it would be profitable or not to grow them on a large scale.

Potatoes.—The so-called "Irish" potatoes were introduced by the undersigned several times during the last 15 years; but I only succeeded in acclimating one seed, presented to me by the late Governor Bent, which was grown on his place, on the Arkansas, about 10 years ago. The experience had of the culture of this plant is, so far, very slight. Some years it has succeeded as well as in the best climates in the world; and others, the seed that did not perish yielded but a very slight return. What is hitherto known here of this plant does not authorize our establishing any data concerning it. However, it is supposed that if the seed which is produced in the ball of the potato were planted several times, it would easily acclimate itself; and it is believed that planting it for many successive years from the eyes of the potato itself finally exhausts its fruitfulness. It is by no means considered impossible to acclimate this plant, since small wild potatoes are found in many parts of the surrounding mountain ranges; and it is believed that this is the true seed of the potato, although it requires two years to reach the state of perfection in which it is known in some parts of the world.

Fruit Trees.—The fruits known in this country are the apple, pear, peach grafted on quince, apricot, grape, and plum. Of these, only the plum is indigenous to this climate; for although wild grapes are found, the shoots of the vine now cultivated were brought from Spain, the same as the seeds of other fruits. All these are of a small size and of an agreeable flavor; still the grape is, perhaps, the best of its class, and of better quality than any to be found on this continent, north of this latitude.

All these fruits have, as yet, been cultivated on so small a scale, and merely for consumption at dessert and between meals, that no estimate can be made of their profitableness. Still the culture of the vine is extending somewhat; wines and brandies, of good quality, are manufactured; and it is believed that the soil planted with vines yields as much or more profit than that sown with wheat or maize.

Manure.—The only manure known here consists of the droppings of domestic animals; and even that is little used.

Meteorology.—The thermometer varied this year from 10° to 88°. I have no monthly returns. Some years the cold and heat are nearly as extreme as in Russia and Africa. The spring rains come on in the months of April or May, and usually continue, twice or oftener, from 15 to 20 days. The autumn rains, as they are called, commence in July, and last, altogether, from 20 to 25 days.

Very respectfully,

MANUEL ALVAREZ.

Hon. THOMAS EWBANK,
Commissioner of Patents.

UTAH.

WASHINGTON CITY, *January* 25, 1852.

SIR: Your Agricultural Circular, requesting information on the subject of the agricultural products of Utah, is before me. Utah is a new country, and hence has not had the advantage of a culture to which the old States have been subjected; but it is in the hands of industrious cultivators, who are reaping the fruit of their honest toil.

The valley of Great Salt Lake has come more immediately under my observation. The character of its best soil is, in one portion a vegetable loam, in another a marly loam, and a third a gravelly stratum, containing some silica. The latitude of Great Salt Lake city is 40° 45′ 44″ north. Its altitude is 4,300 feet. The climate is milder and drier in general than it is in the same parallel on the Atlantic coast. The temperature in the Salt Lake valley in the winter season is more uniform than that of the Atlantic States at the same season, the thermometer rarely descending to zero. There is but little rain, except on the mountains, between the 1st of May and the 1st of October; and hence the necessity of artificial irrigation in most places which are susceptible of it. Wheat, rye, barley, buckwheat, oats, and Indian corn are its chief agricultural products, and all the garden vegetables peculiar to the middle and western States of this Union are produced in great perfection. Cotton, sugar, and

rice are not susceptible of cultivation in the region described. Tobacco and sweet potatoes can be produced in limited quantities.

As to the necessities of a new settlement, so remote from market, and where everything produced isconsumed by new settlers and emigrants on their route to California and Oegon, I am unable to give your interrogatories any definite answer, as the statistical information is not before me; and not being a practical agriculturist, I must content myself with a brief, and very general and imperfect, statement touching the interrogatories referred to, without reference to their form or order.

Wheat.—The Taos, club-headed, and seven-headed wheat frequently yield from 60 to 70 bushels to the acre, but the average product is from 35 to 40 bushels per acre. The soil is first ploughed from 8 to 10 inches deep, and harrowed two or three times. Seeding, any time from September to the 1st of May. The quantity of seed used per acre varies from 3 pecks to a bushel and a half; and the harvest is from June until the month of September.

Maize, or Indian Corn, produces from 20 to 50 bushels to the acre. The best and usual system of culture, is ploughing, harrowing, and irrigating from 3 to 5 times.

Oats yield from 25 to 50 bushels per acre from 2 bushels of seed.

Barley.—Average yield about 35 bushels per acre.

Rye, Peas, and Beans are but little cultivated.

Grasses.—Of the several kinds, the best for hay are the Deseret clover and the muskeet grass. The average yield is about 2 tons per acre, and the price is usually about $10 per ton.

Turnips, Beets, &c.—The cultivation of these roots, as a field crop, is on the increase. The sugar beet is grown in great abundance. The average yield is from 200 to 300 bushels per acre.

Dairy.—The average yearly produce of butter and cheese per cow will not exceed 75 pounds. After June the grasses dry up, the cows become fat, and give but little milk. The average price of butter and cheese is 25 cents per pound. The value of good milch cows in spring and fall is from $25 to $30.

Horses.—The rearing of horses and mules is profitable.

Sheep and Wool.—Wool-growing is very profitable. Price per pound, from 50 to 75 cents. The price of sheep is from $3 to $5. Large breeds of sheep are more profitable, either for wool or mutton, than the small breeds. It costs no more to produce a pound of fine merino than of ordinary coarse wool.

Hogs.—There are but few raised, and the price of pork is consequently dear.

With great respect, your obedient servant,

JOHN M. BERNHISEL,
Delegate from Utah.

Hon. THOS. EWBANK.

VI.

AGRICULTURAL, COMMERCIAL, AND MANUFACTURING STATISTICS.

AGRICULTURAL PRODUCTIONS OF THE UNITED STATES, SEVENTH CENSUS, 1850.

States.	Acres of land improved.	Acres of land unimproved.	Cash value of farms.	Value of farming implements and machinery.	Horses.
Maine	2,039,596	2,515,797	$54,861,748	$2,284,554	41,721
New Hampshire	2,251,488	1,140,926	55,245,997	2,314,125	34,233
Vermont	2,591,379	1,525,368	59,727,731	2,790,237	61,057
Massachusetts	2,133,436	1,222,576	109,076,347	3,209,584	42,216
Rhode Island	356,487	197,451	17,070,802	497,201	6,168
Connecticut	1,768,178	615,701	72,726,422	1,892,541	26,879
New York	12,408,968	6,710,020	554,546,642	22,084,926	447,014
New Jersey	1,767,991	984,985	120,237,511	4,425,503	63,955
Pennsylvania	8,628,619	6,294 728	407,876,099	14,722,541	350,398
Delaware	580,862	375,282	18,880,031	510,279	13,852
Maryland	2,797,905	1,836,445	87,178,545	2,463,443	75,684
District of Columbia	16,267	11,187	1,730,460	40,320	824
Virginia	10,361,155	15,792,176	216,401,441	7,021,772	272,403
North Carolina	5,453,977	15,543,010	67,891,766	3,931,532	148,693

South Carolina	4,072,651	12,145,049	82,431,684	4,136,354	97,171
Georgia	6,378,479	16,442,900	95,753,445	5,894,150	151,331
Florida	349,049	1,236,240	6,323,109	658,795	10,848
Alabama	4,435,614	7,702,067	64,323,224	5,125,663	128,001
Mississippi	3,444,358	7,046,061	54,738,634	5,762,927	115,460
Louisiana	1,590,025	3,939,018	75,814,398	11,576,938	89,514
Texas	639,107	14,454,669	16,398,768	2,133,731	75,419
Arkansas	781,531	1,816,684	15,265,245	1,601,296	60,197
Tennessee	5,175,173	13,808,849	97,851,212	5,360,220	270,636
Kentucky	11,368,270	10,972,478	154,330,262	5,169,037	315,682
Ohio	9,851,493	8,146,000	358,758,603	12,750,585	463,397
Michigan	1,929,110	2,454,780	51,872,446	2,891,371	58,506
Indiana	5,046,543	7,746,879	136,385,173	6,704,444	314,299
Illinois	5,039,545	6,997,867	96,133,290	6,405,561	267,653
Missouri	2,924,991	6,767,937	63,057,482	3,965,945	223,593
Iowa	824,682	1,911,382	16,657,567	1,172,869	38,536
Wisconsin	1,045,499	1,931,159	28,528,563	1,641,568	30,179
California	62,324	3,831,571	3,874,041	103,483	21,719
TERRITORIES.					
Minnesota	5,035	23,346	161,948	15,981	860
Oregon	132,857	299,951	2,849,170	183,423	8,046
Utah	16,333	30,516	311,799	84,288	2,429
New Mexico	166,201	124,370	1,653,952	77,960	5,079
	118,435,176	184,596,025	3,266,925,537	151,605,147	4,325,652

Agricultural Productions of the United States—Continued.

States.	Asses and Mules.	Milch Cows.	Working Oxen	Other Cattle.	Sheep.
Maine	55	133,556	83,893	125,890	451,577
New Hampshire	19	94,277	59,027	114,606	384,756
Vermont	218	146,146	48,497	154,025	919,992
Massachusetts	34	130,099	46,611	83,284	188,651
Rhode Island	1	28,698	8,189	9,375	44,296
Connecticut	49	85,461	46,988	80,226	174,181
New York	963	931,324	178,909	767,406	3,453,241
New Jersey	4,089	118,736	12,070	80,455	160,488
Pennsylvania	2,259	530,224	61,527	562,195	1,822,357
Delaware	791	19,248	9,797	24,166	27,503
Maryland	5,644	86,859	34,135	98,595	177,902
District of Columbia	57	813	104	123	150
Virginia	21,480	317,619	89,513	669,137	1,310,004
North Carolina	25,259	221,799	37,309	434,402	595,249
South Carolina	37,483	193,244	20,507	563,935	285,551
Georgia	57,379	324,223	73,286	690,019	560,435
Florida	5,092	72,876	5,794	182,415	23,311
Alabama	59,895	227,791	66,961	433,263	371,880
Mississippi	54,547	214,231	83,485	436,254	304,929
Louisiana	44,849	105,576	54,968	414,798	110,333
Texas	12,364	214,758	49,982	636,805	99,098
Arkansas	11,559	93,151	34,239	165,320	91,256
Tennessee	75,303	250,459	86,255	414,051	811,591
Kentucky	65,609	247,475	62,074	443,763	1,102,121
Ohio	3,423	544,499	65,381	749,067	3,942,929
Michigan	70	99,676	55,350	119,471	746,435

Indiana	6,599	284,554	40,221	389,891	1,122,493
Illinois	10,573	294,671	76,156	541,209	894,043
Missouri	41,508	228,553	111,268	445,615	756,309
Iowa	754	45,704	21,892	69,025	149,960
Wisconsin	156	64,339	42,801	76,293	124,892
California	1,666	4,280	4,780	253,599	17,574
TERRITORIES.					
Minnesota	14	607	655	740	80
Oregon	420	9,427	8,114	24,188	15,382
Utah	325	4,861	5,266	2,489	3,262
New Mexico	8,654	10,635	12,257	10,085	377,271
	559,070	6,391,946	1,698,261	10,265,180	21,620,482

Agricultural Productions of the United States—Continued.

States.	Swine.	Value of live stock.	Wheat, bushels of.	Rye, bushels of.	Indian corn, bushels of.
Maine	54,598	$9,705,726	296,259	102,916	1,750,056
New Hampshire	63,487	8,871,901	185,658	183,117	1,573,670
Vermont	66,278	12,640,248	525,925	176,207	2,032,016
Massachusetts	81,119	9,649,710	31,221	481,021	2,345,490
Rhode Island	19,509	1,532,637	49	26,409	539,201
Connecticut	76,472	7,467,490	41,762	600,893	1,935,043
New York	1,018,252	73,570,499	13,121,498	4,148,182	17,858,400
New Jersey	250,370	10,679,291	1,601,190	1,255,578	8,759,704
Pennsylvania	1,040,366	41,500,053	15,367,691	4,805,160	19,835,214
Delaware	56,261	1,849,281	482,511	8,066	3,145,533
Maryland	352,911	7,997,634	4,494,680	226,014	11,104,631
District of Columbia	1,635	71,643	17,370	5,509	65,230
Virginia	1,830,743	33,636,659	11,232,616	458,930	35,254,319
North Carolina	1,812,813	17,717,647	2,130,102	229,563	27,941,051
South Carolina	1,065,503	15,060,015	1,066,277	43,790	16,271,454
Georgia	2,168,617	25,728,416	1,088,534	53,750	30,080,099
Florida	209,453	2,880,058	1,027	1,152	1,996,809
Alabama	1,904,540	21,690,112	294,044	17,261	28,754,048
Mississippi	1,582,734	19,403,662	137,990	9,606	22,446,552
Louisiana	597,301	11,152,275	417	475	10,226,373
Texas	683,914	10,266,880	41,689	3,108	5,926,611
Arkansas	836,727	6,647,969	199,639	8,047	8,893,939
Tennessee	3,114,111	29,978,016	1,619,386	89,163	52,276,223
Kentucky	2,861,163	29,591,387	2,140,822	415,073	58,675,291
Ohio	1,964,770	44,121,741	14,487,351	425,718	59,078,695

Michigan	205,847	8,008,734	4,925,889	105,871	5,641,420
Indiana	2,263,776	22,478,555	6,214,458	78,792	52,964,363
Illinois	1,915,910	24,209,258	9,414,575	83,364	57,646,984
Missouri	1,692,043	19,776,851	2,966,928	44,112	36,069,543
Iowa	323,247	3,689,275	1,530,581	19,916	8,656,799
Wisconsin	159,276	4,879,385	4,286,131	81,253	1,988,979
California	2,776	3,351,058	17,328	- -	12,236
TERRITORIES.					
Minnesota	734	92,859	1,401	125	16,725
Oregon	30,325	1,876,189	211,943	106	2,918
Utah	914	546,968	107,702	210	9,899
New Mexico	7,314	1,494,629	196,516	- -	365,411
	30,315,719	543,822,711	100,479,150	14,188,457	592,141,230

Agricultural Productions of the United States—Continued.

States.	Oats, bushels of.	Rice, pounds of.	Tobacco, pounds of.	Ginned cotton, bales, of 400 pounds each.	Wool, pounds of.
Maine	2,181,037	-	-	-	1,364,034
New Hampshire	973,381	-	50	-	1,108,476
Vermont	2,307,714	-	-	-	3,410,993
Massachusetts	1,165,106	-	138,346	-	585,136
Rhode Island	215,232	-	-	-	129,692
Connecticut	1,255,738	-	1,267,624	-	497,454
New York	26,552,814	-	83,189	-	10,071,301
New Jersey	3,378,063	-	310	-	375,396
Pennsylvania	21,538,156	-	912,651	-	4,481,570
Delaware	604,518	-	-	-	57,768
Maryland	2,242,151	-	21,407,497	-	480,226
District of Columbia	8,134	-	7,800	-	525
Virginia	10,179,045	17,154	56,803,218	3,947	2,860,765
North Carolina	4,052,078	5,465,868	11,984,786	73,849	970,738
South Carolina	2,322,155	159,936,613	74,285	300,901	487,233
Georgia	3,820,044	38,950,691	423,924	499,091	990,019
Florida	66,586	1,075,090	998,614	45,131	23,247
Alabama	2,965,697	2,311,252	164,990	564,429	657,118
Mississippi	1,503,288	2,719,856	49,960	484,293	559,619
Louisiana	89,637	4,425,349	26,878	178,737	199,897
Texas	178,883	87,916	66,897	57,596	131,374
Arkansas	656,183	63,179	218,936	65,346	182,595
Tennessee	7,703,086	258,854	20,148,932	194,532	1,364,378
Kentucky	8,201,311	5,688	55,501,196	758	2,297,403
Ohio	13,472,742	-	10,454,449	-	10,196,371

Michigan	2,866,056	- -	1,245	- -	2,043,283
Indiana	5,655,014	- -	1,044,620	- -	2,610,287
Illinois	10,087,241	- -	841,394	14	2,150,113
Missouri	5,243,476	700	17,100,884	- -	1,615,860
Iowa	1,524,345	500	6,041	- -	373,898
Wisconsin	3,414,672	- -	1,268	- -	253,963
California	- -	- -	1,000	- -	5,520
TERRITORIES.					
Minnesota	30,582	- -	-	- -	85
Oregon	65,146	- -	325	- -	29,686
Utah	10,900	- -	70	- -	9,222
New Mexico	5	- -	8,467	- -	32,901
	146,533,216	215,312,710	199,739,746	2,468,625	52,518,143

Agricultural Productions of the United States—Continued.

States.	Peas and beans, bushels of.	Irish potatoes, bushels of.	Sweet potatoes, bushels of.	Barley, bushels of.	Buckwheat, bushels of.
Maine	205,541	3,436,040	-	151,731	104,523
New Hampshire	70,856	4,304,919	-	70,256	65,265
Vermont	101,859	4,947,351	-	42,157	208,699
Massachusetts	43,709	3,585,384	-	112,385	106,095
Rhode Island	6,346	651,029	-	18,875	1,245
Connecticut	19,090	2,689,725	80	19,099	229,297
New York	741,636	15,398,362	5,622	3,585,059	3,183,955
New Jersey	14,174	3,207,236	508,015	6,492	878,934
Pennsylvania	55,231	5,980,732	52,172	165,584	2,193,692
Delaware	4,120	240,542	65,443	56	8,615
Maryland	12,816	764,939	208,993	745	103,671
District of Columbia	7,754	28,292	3,497	75	378
Virginia	521,581	1,316,933	1,813,671	25,437	214,898
North Carolina	1,584,252	620,318	5,095,709	2,735	16,704
South Carolina	1,026,900	136,494	4,337,469	4,583	283
Georgia	1,142,011	227,379	6,986,428	11,501	250
Florida	135,359	7,828	757,226	-	55
Alabama	892,701	246,201	5,475,204	3,958	348
Mississippi	1,072,757	261,482	4,741,795	229	1,121
Louisiana	161,732	95,632	1,428,453	-	3
Texas	179,332	93,548	1,323,170	4,776	59
Arkansas	285,738	193,832	788,149	177	175
Tennessee	369,321	1,060,844	2,777,716	2,737	19,427
Kentucky	262,574	1,492,487	998,184	95,343	16,097
Ohio	60,168	5,057,769	187,991	354,358	638,064

Michigan	74,254	2,359,897	1,177	75,249	472,917
Indiana	35,773	2,083,337	201,711	45,483	149,740
Illinois	82,814	2,514,861	157,433	110,795	184,504
Missouri	45,974	934,627	332,120	9,631	23,590
Iowa	4,775	276,120	6,243	25,093	52,516
Wisconsin	20,657	1,402,077	879	209,602	79,876
California	2,292	9,292	1,000	9,712	
TERRITORIES.					
Minnesota	10,002	21,145	200	1,316	515
Oregon	6,566	91,326			
Utah	289	43,968	60	1,799	332
New Mexico	15,688	3	- -	5	100
	9,219,642	65,781,751	38,255,811	5,167,213	8,955,945

Agricultural Productions of the United States—Continued.

States.	Value of orchards, product in dollars.	Wine, gallons of.	Value of produce, market gardens.	Butter, pounds of.	Cheese, pounds of.
Maine	342,865	724	$122,387	9,243,811	2,434,454
New Hampshire	248,563	344	56,810	6,977,056	3,196,563
Vermont	315,045	659	18,853	11,871,451	8,729,834
Massachusetts	463,995	4,688	600,020	8,071,370	7,088,142
Rhode Island	63,994	1,013	98,298	995,670	316,508
Connecticut	175,118	4,269	196,874	6,498,119	5,363,277
New York	1,761,950	9,172	912,047	79,766,094	49,741,413
New Jersey	607,268	1,811	475,242	9,487,210	365,756
Pennsylvania	723,389	25,590	688,714	39,878,418	2,505,034
Delaware	46,574	145	12,714	1,055,308	3,187
Maryland	164,051	1,431	200,869	3,806,160	3,975
District of Columbia	14,843	863	67,222	14,872	1,500
Virginia	177,137	5,408	183,047	11,089,359	436,298
North Carolina	34,348	11,058	39,462	4,146,290	95,921
South Carolina	35,108	5,880	47,286	2,981,850	4,970
Georgia	92,776	796	75,500	4,640,559	46,976
Florida	1,280	10	8,721	371,498	18,015
Alabama	15,408	220	84,821	4,008,811	31,412
Mississippi	50,405	407	46,250	4,346,234	21,191
Louisiana	22,359	15	148,329	683,069	1,957
Texas	12,605	99	12,254	2,326,556	91,619
Arkansas	40,141	35	17,150	1,854,239	30,088
Tennessee	52,894	93	97,183	8,139,585	177,681
Kentucky	106,160	8,093	293,120	9,877,868	213,784
Ohio	695,921	48,207	214,204	34,449,379	20,819,542

Michigan	132,650	1,654	14,738	7,065,878	1,011,492
Indiana	324,940	14,055	72,864	12,881,539	624,564
Illinois	446,089	2,997	127,494	12,526,543	1,278,225
Missouri	512,527	10,563	99,454	7,792,499	202,122
Iowa	8,434	420	8,848	2,171,188	209,840
Wisconsin	4,823	113	32,142	3,633,750	400,283
California	17,700	58,055	75,275	705	150
TERRITORIES.					
Minnesota	- -	- -	150	1,100	
Oregon	1,271	- -	90,241	211,461	36,980
Utah	- -	- -	23,868	83,309	30,988
New Mexico	8,231	2,663	6,679	111	5,848
	7,720,862	221,249	5,270,130	312,948,915	105,539,599

Agricultural Productions of the United States—Continued.

States.	Hay, tons of.	Clover seed, bushels of.	Other grass seeds, bushels of.	Hops, pounds of.	Hemp rotted by dew.
Maine	755,889	9,097	9,214	40,120	
New Hampshire	598,854	829	8,071	257,174	
Vermont	866,989	760	14,996	258,513	
Massachusetts	651,807	1,002	5,085	121,595	
Rhode Island	74,818	1,328	3,708	227	
Connecticut	516,131	13,841	16,608	554	
New York	3,728,797	88,222	96,473	2,536,299	1
New Jersey	435,950	28,280	63,051	2,133	
Pennsylvania	1,842,970	125,030	53,913	22,088	282
Delaware	30,159	2,525	1,403	348	
Maryland	157,956	15,217	2,561	1,870	63
District of Columbia	2,279	3	- -	15	
Virginia	369,098	29,727	23,428	11,506	90
North Carolina	145,662	576	1,275	9,246	
South Carolina	20,925	376	30	26	
Georgia	23,449	132	428	261	
Florida	2,510	- -	2	14	
Alabama	32,685	138	547	276	
Mississippi	12,505	84	533	473	7
Louisiana	25,752	2	97	125	
Texas	8,279	10	- -	7	
Arkansas	3,977	90	436	157	
Tennessee	74,092	5,096	9,118	1,032	3,913
Kentucky	113,655	3,230	21,451	5,304	40,936
Ohio	443,142	102,107	37,310	63,731	140

Michigan	404,934	16,989	9,785	10,663	166
Indiana	403,230	18,321	11,951	92,796	341
Illinois	601,952	3,427	14,380	3,551	142
Missouri	116,743	615	4,337	3,130	17,207
Iowa	89,055	342	2,096	8,242	
Wisconsin	275,662	483	342	15,930	300
California	2,038	- -	483		
TERRITORIES.					
Minnesota	2,019				
Oregon	373	4	22	8	
Utah	4,805	2	- -	50	
New Mexico					
	12,839,141	467,983	413,154	3,467,514	63,588

Agricultural Productions of the United States—Continued.

States.	Hemp rotted by water, tons of.	Flax, pounds of.	Flax-seed, bushels of.	Silk cocoons, pounds of.	Maple sugar, pounds of.
Maine	-	17,081	580	252	93,540
New Hampshire	-	7,652	189	4,191	1,294,863
Vermont	-	20,752	939	268	5,980,955
Massachusetts	-	1,162	72	7	795,525
Rhode Island	-	85	-	-	28
Connecticut	-	17,928	703	328	50,796
New York	3	940,577	57,963	1,774	10,357,484
New Jersey	-	182,965	16,525	23	2,197
Pennsylvania	2,006	528,079	41,650	285	2,326,525
Delaware	570	11,050	858		
Maryland	-	35,686	2,446	39	47,740
District of Columbia					
Virginia	51	999,450	52,318	517	1,227,665
North Carolina	3	593,796	38,196	229	27,932
South Carolina	-	333	55	123	200
Georgia	73	5,387	622	813	50
Florida	-	50	-	6	
Alabama	70	3,841	67	167	643
Mississippi	-	665	26	2	
Louisiana	-	-	-	29	255
Texas	-	1,048	26	22	
Arkansas	15	12,291	321	38	9,330
Tennessee	1,183	367,807	18,905	1,923	158,557
Kentucky	14,756	7,793,123	75,579	1,301	437,345
Ohio	50	446,937	118,880	1,552	4,588,209

Michigan	37	6,994	1,421	8	2,438,987
Indiana	1,071	584,469	36,888	387	2,921,642
Illinois	141	160,063	10,785	47	248,904
Missouri	5,351	520,008	13,641	186	178,750
Iowa	-	62,553	1,959	246	78,407
Wisconsin	2	68,393	1,191	-	610,976
California					
TERRITORIES.					
Minnesota	-	-	-	-	2,950
Oregon	-	640			
Utah	-	550	5		
New Mexico					
	25,380	13,391,415	562,810	14,763	33,980,457

Agricultural Productions of the United States—Continued.

States.	Cane, sugar, hhds., of 1,000 pounds.	Molasses, galls. of.	Beeswax and honey, pounds of.	Value of home-made manufactures.	Value of animals slaughtered.
Maine	-	3,167	189,618	$513,599	$1,646,773
New Hampshire	-	9,811	117,140	393,455	1,522,873
Vermont	-	5,997	249,432	278,331	1,871,468
Massachusetts	-	4,693	59,508	205,333	2,500,924
Rhode Island	-	4	6,347	26,495	667,486
Connecticut	-	665	93,304	192,252	2,202,266
New York	-	56,529	1,756,190	1,280,333	13,573,983
New Jersey	-	934	156,694	112,781	2,638,552
Pennsylvania	-	50,652	838,509	749,132	8,219,848
Delaware	-	50	41,248	38,121	373,655
Maryland	-	1,430	74,802	111,821	1,954,800
District of Columbia	-	-	550	2,075	9,038
Virginia	-	40,322	880,767	2,156,312	7,503,006
North Carolina	-	704	512,289	2,086,522	5,767,866
South Carolina	671	15,904	216,281	909,525	1,302,637
Georgia	1,644	216,150	732,514	1,838,968	6,339,762
Florida	2,752	352,893	18,971	75,582	514,685
Alabama	8,242	83,428	897,021	1,934,120	4,823,485
Mississippi	388	18,318	397,460	1,164,020	3,636,582
Louisiana	226,001	10,931,177	96,701	139,232	1,458,990
Texas	7,351	441,638	380,532	255,719	1,106,032
Arkansas	-	18	192,338	638,217	1,162,913
Tennessee	248	7,223	1,036,572	3,137,710	6,401,765
Kentucky	197	40,047	1,156,939	2,456,838	6,459,318
Ohio	--	308,308	804,275	1,712,196	7,439,243

Michigan	19,823	359,232	340,947	1,328,327
Indiana	180,325	935,329	1,631,039	6,567,935
Illinois	8,354	869,444	1,155,902	4,972,286
Missouri	5,636	1,327,812	1,663,016	3,349,517
Iowa	3,162	321,711	221,292	821,164
Wisconsin	9,874	131,005	43,621	920,178
California	- -	- -	7,000	100,173
TERRITORIES.				
Minnesota	- -	80	- -	2,840
Oregon	24	- -	- -	164,530
Utah	58	10	1,392	67,985
New Mexico	4,236	2	6,033	82,125
	247,778	12,821,574	14,850,627	27,478,931	119,475,020

COMMERCE OF THE UNITED STATES.

[From the Courier and Enquirer.]

EXPORTS OF BREADSTUFFS AND PROVISIONS.

Table exhibiting the aggregate value of Breadstuffs and Provisions exported annually from 1821 *to* 1851, *inclusive.*

	Value.
Year ending September 30, 1821 - - -	$12,341,901
Do do 1822 - - -	13,886,855
Do do 1823 - - -	13,767,847
Do do 1824 - - -	15,059,484
Do do 1825 - - -	11,634,449
Do do 1826 - - -	11,302,496
Do do 1827 - - -	11,685,556
Do do 1828 - - -	11,461,144
Do do 1829 - - -	13,131,858
Do do 1830 - - -	12,075,430
Do do 1831 - - -	17,538,227
Do do 1832 - - -	12,424,703
Do do 1833 - - -	14,209,128
Do do 1834 - - -	11,524,024
Do do 1835 - - -	12,009,399
Do do 1836 - - -	10,614,130
Do do 1837 - - -	9,688,359
Do do 1838 - - -	9,636,650
Do do 1839 - - -	14,147,779
Do do 1840 - - -	19,067,535
Do do 1841 - - -	17,196,102
Do do 1842 - - -	16,902,876
9 months ending June 30, 1843 - - -	11,204,123
Year ending do 1844 - - -	17,970,135
Do do 1845 - - -	16,143,421
Do do 1846 - - -	16,143,421
Do do 1847 - - -	27,701,121
Do do 1848 - - -	68,701,921
Do do 1849 - - -	37,472,751
Do do 1850 - - -	38,155,507
Do do 1851 - - -	26,051,373
Total - - - - - -	559,326,573

Statement showing amount, value, and average price per pound of Cotton exported from the United States, from 1821 *to* 1851, *inclusive.*

Years.	Sea Island, pounds.	Other, pounds.	Total, pounds.	Value, dollars.	Average price per lb., cents.
1821	11,344,066	113,549,339	124,893,405	20,157,480	16.2
1822	11,250,635	133,424,460	144,675,095	24,035,058	16.6
1823	12,136,688	161,586,582	173,723,270	20,445,520	11.8
1824	9,525,722	132,843,941	142,369,663	21,947,401	15.4
1825	9,665,278	166,784,629	176,449,907	36,846,649	20.9
1826	5,972,852	198,562,563	204,535,415	25,025,214	12.2
1827	15,140,798	279,169,317	294,310,115	29,359,545	10
1828	11,288,419	199,302,044	210,590,463	22,487,229	10.7
1829	12,833,307	252,003,879	264,837,186	26,575,311	10
1830	8,147,165	290,311,937	298,459,102	29,674,883	9.2
1831	8,311,762	268,668,022	216,979,784	25,289,492	9.1
1832	8,743,373	313,471,749	322,215,122	31,724,682	9.8
1833	11,142,987	313,565,617	324,698,604	36,191,105	11.1
1834	8,085,937	376,631,970	384,717,907	49,448,402	12.8
1835	7,752,736	379,606,256	387,358,992	64,961,302	16.8
1836	7,849,597	415,781,710	423,631,307	71,284,925	16.8
1837	5,286,971	438,924,566	444,211,537	63,240,102	14.2
1838	7,286,340	588,665,957	595,952,297	61,556,811	10.3
1839	5,107,404	408,516,808	413,621,312	61,238,982	14.8
1840	8,779,609	735,161,392	743,941,061	63,870,307	8.5
1841	6,257,424	523,966,676	530,204,100	54,330,341	10.2
1842	7,254,099	577,462,918	584,711,017	47,593,464	8.1

Cotton Exports—Continued.

Years.	Sea Island, pounds.	Other, pounds.	Total pounds.	Value, dollars.	Average price per lb., cents.
1843	7,515,079	784,782,027	792,297,105	49,119,805	6.2
1844	6,099,076	657,534,379	663,633,455	54,063,501	8.1
1845	9,389,625	863,515,371	872,905,996	51,739,643	5.92
1846	9,388,533	538,169,522	547,558,055	42,767,341	7.81
1847	6,293,973	520,925,985	527,219,958	53,415,848	10.34
1848	7,724,148	806,556,283	814,274,431	61,998,294	7.61
1849	11,969,259	1,014,633,010	1,026,602,269	66,396,967	6.4
1850	8,236,463	627,145,141	635,381,604	71,984,616	11.3
1851	8,299,655	918,937,433	927,237,089	112,315,317	12.11

GOODS IMPORTED, RE-EXPORTED, AND CONSUMED.

Statement exhibiting the value of Foreign Merchandise imported, re-exported, and consumed annually, from 1821 *to* 1851, *inclusive; and also the estimated Population and Rate of Consumption per capita, during the same period.*

Years ending September 30.	Value of foreign merchandise.			Population.	Consumption per capita.
	Imported.	Re-exported.	Consumed and on hand.		
1821	$65,585,724	$21,302,488	$41,283,236	9,960,974	4 14
1822	83,241,511	22,286,202	60,955,309	10,283,757	5 92
1823	77,579,267	27,543,622	50,035,649	10,806,540	4 71
1824	80,549,007	25,337,157	55,211,850	10,929,323	5 05
1826	96,340,075	32,590,643	63,649,432	11,252,106	5 66
1827	84,974,477	24,539,612	60,434,612	11,574,889	5 22
1828	79,484,068	23,403,136	56,080,932	11,857,672	4 71
1829	88,509,824	21,595,017	66,914,807	12,220,455	5 47
1830	74,492,227	16,657,478	57,834,049	12,543,238	4 61
1831	70,876,920	14,387,479	56,489,441	12,866,020	4 39
1832	103,191,124	20,033,526	83,157,598	13,286,364	6 25
1833	101,029,266	24,036,473	76,989,793	13,706,707	5 61
1834	108,118,311	19,822,735	88,295,576	14,127,050	6 25
1835	126,521,332	23,312,811	103,208,521	14,547,393	7 09
1836	149,895,742	20,504,495	129,391,247	14,967,736	8 64
1837	189,980,035	21,746,360	168,233,675	15,388,079	10 93
1838	140,989,217	21,854,963	119,914,255	15,808,422	7 53
1839	113,117,284	12,452,795	101,264,609	16,228,766	6 23
1840	162,092,132	17,494,525	144,597,607	16,649,108	8 68
	107,151,619	18,190,312	38,951,287	17,069,453	5 21

Goods imported, &c.—Continued.

Years ending September 30.	Value of foreign merchandise.			Population.	Consumption per capita.
	Imported.	Re-exported.	Consumed and on hand.		
1841	$127,956,177	$15,499,081	$112,447,096	17,612,507	$6 38
1842	100.162,087	11,721,538	88,440,549	18,155,561	4 87
9 months to June 30, 1843	64,755,799	6,552,707	58,201,092	18,698,615	3 11
Year to June 30, 1844	108,435,035	11,484,867	96,950,168	19,241,670	5 03
1845	117,254,564	15,346,830	101,907,735	19,784,725	5 15
1846	121,691,797	11,346,623	110,345,174	20,337,780	5 42
1847	146,545,638	8,011,158	138,534,480	20,870,835	6 60
1848	154,998,928	21,132,315	133,866,603	21,413,890	6 25
1849	147,857,489	13,088,865	134,768,574	21,956,945	6 13
1850	178,136,318	14,951,808	163,184,510	22,500,000	7 25
1851	215,725,995	9,738,695	205,987,300	23,500,000	8 75

VALUE OF IMPORTS CONTINUED.

Statement exhibiting the total value of Imports and the Imports consumed in the United States, and Domestic Exports, exclusive of Specie, during each fiscal year from 1821 *to* 1851.

Year.	Total imports.	Imports consumed, exclusive of specie.	Domestic produce exported, exclusive of specie.
1821	$62,585,724	$43,696,405	$43,671,894
1822	83,241,541	68,367,425	49,874,979
1823	77,579,267	51,308,936	47,155,408
1824	80,549,007	53,846,567	50,649,500
1825	96,340,075	66,395,722	66,944,745
1826	84,974,477	57,652,577	52,449,855
1827	79,484,068	54,991,108	57,878,117
1828	88,509,824	66,975,472	49,976,632
1829	74,492,527	54,741,571	55,087,307
1830	70,876,920	49,575,099	58,524,878
1831	103,191,124	82,808,110	59,218,583
1832	101,029,266	75,327,688	61,726,529
1833	108,118,311	83,470,067	69,950,856
1834	126,521,332	86,973,147	80,623,662
1835	149,895,742	122,007,974	100,459,481
1836	189,980,035	158,811,392	106,570,942
1837	140,989,217	113,310,571	94,280,895
1838	113,717,404	86,552,598	95,560,880
1839	162,092,132	145,870,816	101,625,533
1840	107,141,519	86,250,335	111,660,569
1841	127,946,177	114,776,309	103,636,236
1842	110,162,087	87,996,318	91,799,242
1843*	64,753,789	37,294,128	77,686,354
1844	108,435,045	97,390,548	99,531,774
1845	117,254,564	105,599,541	98,455,330
1846	121,691,797	110,048,859	101,718,042
1847	146,545,638	116,257,595	150,574,844
1848	154,998,928	140,651,902	130,203,703
1849	147,857,439	132,565,108	131,710,084
1850	178,136,318	164,032,033	134,900,233
1851	215,725,995	201,019,390	178,546,555

*Nine months ending June 30.

FOREIGN AND DOMESTIC EXPORTS.

Statement exhibiting the value of the Foreign Exports, Total Exports, exclusive of Specie, and the Tonnage employed, during each fiscal year from 1821 to 1851.

Year.	Foreign Merchandise exported, exclusive of specie.	Total exports.	Tonnage.
1821 - -	$10,824,429	$64,974,382	1,298,958
1822 - -	11,504,270	72,160,281	1,324,699
1823 - -	21,172,436	74,699,030	1,336,566
1824 - -	18,322,605	75,986,657	1,389,168
1825 - -	23,793,588	99,535,388	1,423,112
1826 - -	20,440,934	77,595,322	1,534,191
1827 - -	16,431,830	82,324,827	1,620,608
1828 - -	14,044,608	72,264,686	1,741,392
1829 - -	12,347,344	72,358,671	1,260,798
1830 - -	13,145,857	73,849,508	1,191,776
1831 - -	13,077,069	81,310,583	1,267,847
1832 - -	19,794,074	87,176,934	1,439,450
1833 - -	17,577,876	90,140,433	1,606,151
1834 - -	21,636,553	104,336,673	1,758,907
1835 - -	14,756,321	121,693,577	1,824,940
1836 - -	17,767,762	128,663,040	1,882,103
1837 - -	17,162,232	117,419,376	1,896,686
1838 - -	9,417,690	108,486,616	1,995,640
1839 - -	10,626,140	121,628,415	2,096,380
1840 - -	12,008,371	132,085,946	2,180,764
1841 - -	8,181,235	121,851,803	2,130,744
1842 - -	8,078,753	104,691,534	1,092,391
1843* - -	5,339,335	84,346,480	2,158,603
1844 - -	6,214,058	111,200,046	2,280,095
1845 - -	7,584,781	114,646,606	2,417,002
1846 - -	8,865,206	113,488,516	2,562,085
1847 - -	6,166,754	158,648,622	3,839,046
1848 - -	7,986,802	154,932,131	3,154,042
1849 - -	8,641,091	145,755,820	3,334,015
1850 - -	9,475,493	151,898,720	3,535,450
1851 - -	9,738,695	217,517,130	

* Nine months ending June 30.

TRADE AND COMMERCE OF THE NEW YORK CANALS.

The *Albany Evening Journal* says: In accordance with our usual custom, soon after the close of canal navigation, we now present our readers with a pretty full account of the amount of property passing through this great artery for the three past seasons.

The canal closed several days earlier than was anticipated, and so suddenly that a large amount of property, consisting principally of flour, wheat, barley, and beef, destined for tide-water, was locked up in the canal between Schenectady and Little Falls; which, had it arrived here, would have materially altered our figures for this year.

Statement showing the total Quantity of each article which came to the Hudson river on all the canals during the years 1849, 1850, *and* 1851.

Articles.	1849.	1850.	1851.
THE FOREST.			
Fur and peltry.....pounds	554,531	656,000	484,160
Product of Wood.			
Boards and scantling ...feet	297,431,140	425,095,442	457,288,982
Shingles.....1,000	51,258	1,868,083	57,706
Timber.....cubic feet	1,497,627	1,666,262	3,189,179
Staves.....pounds	154,159,359	202,224,000	157,251,190
Woods and cords	11,977	12,411	12,640
Ashes (pot and pearl)..bbls.	31,289	52,237	28,198
AGRICULTURE.			
Product of Animals.			
Pork.....barrels	73,885	46,618	45,013
Beef..... do	105,492	97,259	77,798
Bacon.....pounds	8,477,754	9,680,000	10,901,923
Cheese..... do	41,097,818	32,584,000	25,598,945
Butter..... do	20,880,409	17,102,000	9,564,268
Lard..... do	9,083,062	8,278,000	10,814,940
Lard oil.....gallons	.....	67,460	240,768
Wool.....pounds	12,731,402	11,988,000	10,517,408
Hides..... do	596,364	458,000	571,743
Tallow..... do	.....	578,000	267,310
Vegetable Food.			
Flour.....barrels	3,263,087	3,256,077	3,358,465
Wheat.....bushels	2,734,389	3,670,754	3,163,682
Rye..... do	322,942	472,305	302,608

Statement—Continued.

Articles.	1849.	1850.	1851.
Corn.....bushels	5,121,270	3,228,056	7,670,345
Cornmeal.....barrels	.....	11,983	7,335
Barley.....bushels	1,400,194	1,744,867	1,881,101
Oats..... do	2,407,895	2,469,637	3,634,682
Bran and shipstuffs..pounds	2,022,031	402,464,000	45,476,249
Peas and beans.....bushels	160,234	79,515	129,502
Potatoes.....	242,211	230,699	600,182
Dried fruit.....pounds	780,369	1,468,000	1,426,350
All other Agricultural Products.			
Cotton.....pounds	316,094	1,114,000	237,330
Unmanufact'd tobacco do	1,896,056	796,000	3,698,690
Hemp.....	.....	66,000	1,161,040
Clover & grass seeds do	2,479,098	1,418,000	559,400
Flaxseed.....	1,081,684	1,146,000	156,500
Hops.....	1,877,805	860,000	550,886
MANUFACTURES.			
Domestic spirits.....gallons	2,107,595	1,517,095	2,810,498
Beer.....barrels	.....	95	63
Linseed oil.....gallons	.....	908	100
Oil, meal, and cake..pounds	.....	6,392,000	6,814,000
Starch.....	.....	2,744,000	2,556,932
Leather.....	5,532,610	7,176,000	8,203,605
Furniture.....	1,116,300	1,102,000	1,056,719
Agricultural implements ...	.....	16,000	316,840
Bar and pig lead.....	11,167	88,000	16,400
Pig iron.....	9,636,166	5,276,000	6,756,400
Castings.....	.....	1,580,000	2,470,730
Machines and parts thereof.	.....	280,000	153,310
Bloom and bar iron.....	27,906,016	22,126,000	33,449,234
Iron ware.....	1,737,690	.....	3,700
Domestic woollens.....	1,055,513	1,018,000	824,340
Domestic cottons.....	2,498,425	1,868,000	2,249,835
Domestic salt.....	283,333	3,164,000	12,962,156
Foreign salt.....	.....	1,326,000	1,195,600
OTHER ARTICLES.			
Live cattle, hogs, and sheep.....pounds	.....	1,578,000	869,350
Stone, lime, and clay. do.	51,323,818	87,916,000	104,167,030
Gypsum.....	2,551,600	6,950,000	9,669,600
Eggs.....	.....	3,280,000	3,678,264

Statement—Continued.

Articles.	1849.	1850.	1851.
Mineral coal	25,169,939	32,146,000	40,622,220
Fish	.....	458,000	277,515
Copper ore	.....	104,000	417,780
Flint enamelled ware	.....	2,000	.....
Sundries	110,244,928	94,112,000	111,020,090

Statement showing the aggregate, in tons, under the divisions, as specified in the above table.

Articles.	1849.	1850.	1851.
The forest	665,547	947,768	921,337
Agriculture	796,600	926,048	895,096
Manufactures	44,288	39,669	53,553
Merchandise	5,873	7,105	5,349
Other articles	94,638	113,273	135,365
Total tons	1,579,936	2,033,863	2,010,700

Statement showing the estimated value of each article which came to the Hudson river, on all the canals, during the years 1849, 1850, 1851.

Articles.	1849.	1850.	1851.
THE FOREST.			
Fur and peltry	$692,864	$818,845	$605,200
Product of Wood.			
Boards and scantling	4,459,157	6,365,724	7,226,127
Shingles	153,774	202,668	205,399
Timber	119,598	440,490	667,465
Staves	693,701	908,612	745,482
Wood	56,892	60,743	58,855
Ashes, pot and pearl	1,016,800	1,518,035	841,731

Statement—Continued.

Articles.	1849.	1850.	1851.
AGRICULTURE.			
Product of Animals.			
Pork	$758,421	$512,768	$693,940
Beef	1,244,360	863,789	661,300
Bacon	514,666	580,922	980,956
Cheese	2,736,211	1,955,122	1,663,606
Butter	2,928,832	2,391,863	1,338,997
Lard	635,814	620,868	973,340
Lard oil	.....	42,506	168,537
Wool	4,072,358	4,372,578	4,101,416
Hides	59,637	54,891	68,432
Tallow	.....	40,524	18,712
Vegetable Food.			
Flour	16,315,435	16,280,425	13,436,542
Wheat	2,993,160	3,937,763	3,051,110
Rye	187,545	315,928	198,099
Corn	2,970,482	2,000,890	4,447,682
Corn meal	.....	35,940	20,172
Barley	868,115	1,417,827	1,484,541
Oats	868,084	1,014,678	1,363,352
Bran and ship-stuffs	242,755	927,853	366,691
Peas and beans	160,234	89,382	143,299
Potatoes	117,918	123,269	342,275
Dried fruit	78,007	132,019	114,108
All other Agricult'l Products.			
Cotton	29,240	153,239	25,530
Unmanufactured tobacco	237,007	159,005	813,712
Hemp	.....	4,960	75,469
Clover and grass seed	148,746	92,106	41,817
Flaxseed	30,536	27,745	3,130
Hops	262,893	159,647	147,380
MANUFACTURES.			
Domestic spirits	526,938	394,301	632,489
Beer	.....	475	315
Linseed oil	.....	591	66
Oil meal and cake	.....	79,859	85,156
Starch	.....	144,054	135,734
Leather	885,080	1,148,068	1,230,572
Furniture	111,631	110,180	105,672

Statement—Continued.

Articles.	1849.	1850.	1851.
Agricultural implements	.....	$777	$15,840
Bar and pig lead	$503	4,300	820
Pig iron	96,362	52,769	67,563
Castings	.....	47,428	74,350
Machines and parts	.....	27,895	15,331
Bloom and bar iron	558,120	442,508	668,985
Iron ware	52,131	.....	111
Domestic woollens	895,991	891,204	725,419
Domestic cottons	698,816	558,532	539,312
Domestic salt	73,666	52,612	56,975
Foreign salt	.....	5,311	1,196
OTHER ARTICLES.			
Live cattle, hogs, sheep	.....	47,349	26,100
Stone, lime, and clay	74,060	118,482	130,882
Gypsum	5,742	14,949	19,339
Eggs	.....	197,544	220,945
Mineral coal	56,633	90,951	102,282
Fish	.....	14,319	12,547
Copper ore	.....	15,747	62,667
Flint enamelled ware	.....	240	.....
Sundries	2,183,548	1,828,914	2,205,495

Statement showing the aggregate value of the property which came to the Hudson river, on all the canals, during the years 1849, 1850, 1851, *under the divisions, as specified in the above table.*

Articles.	1849.	1850.	1851.
The forest	$7,192,796	$10,315,117	$10,380,259
Agriculture	38,455,456	38,311,546	36,520,296
Manufactures	3,899,238	3,960,864	4,355,907
Merchandise	508,048	563,615	406,711
Other articles	2,319,983	2,323,495	2,789,257
	52,375,521	55,474,637	54,452,430

BUSINESS OF RAILROADS.

Michigan Central Railroad.

The report of the Michigan Central Railroad for the six months ending 30th November, 1851, shows the following table of receipts and expenditures, as well as the present financial condition of the company:

Date.		Receipts.	Expenditures.
June 1..	Balance on hand.....	$76,312 83	
June 30..	For the month.....	101,678 81	$30,912 81
July 31..	Do....do.....	82,257 00	29,343 98
Aug. 31..	Do....do.....	97,877 75	29,839 09
Sep. 30..	Do....do.....	123,199 78	35,753 75
Oct. 31..	Do....do.....	197,743 07	32,185 11
Nov. 31..	Do....do.....	101,324 47	29,232 85
	Interest and miscellaneous.....	.....	131,760 85
	Balance to new account.....	.....	461,364 80
	Total.....	780,393,28	780,393 28

This table shows that the gross receipts for the six months were $703,080 45, and the running expenses $187,267 59—leaving a balance of $516,812 86; from which deduct the interest and miscellaneous expenses, and the net income of the company is $385,051 97, against $288,569 65, in the corresponding six months in 1850—being an increase this year of $96,482 32. This gain is entirely in the passenger and miscellaneous receipts—there being a diminution of $9,208 21 in the freight receipts, which is attributed to the low price of breadstuffs; the Western owners of which have preferred holding to forwarding this year. The company, therefore, anticipate a large freight business next year, as the crop of 1851 is the largest ever raised in Michigan and the States of the vicinity.

The assets and liabilities of the company on the 1st December were:

LIABILITIES.

Capital - - - - - - - - -	$2,886,700 00
Eight per cent. loan convertible - - - - -	2,459,500 00
Do. do. inconvertible - - - - -	1,149,950 00
Seven per cent. do. do. - - - - -	171,800 00
Bills payable - - - - - - - -	260,412 57
Due local treasurer - - - - - - -	1,375 43
Income balance - - - - - - - -	461,364 80
	7,391,102 80

ASSETS.

Purchase road	$2,000,000 00
Expenditure since	5,242,546 59
Superintendent's hands	50,819 47
New Albany and Salem road	32,010 00
Cash	64,726 74
	7,391,102 80

As has been previously mentioned, a dividend of 14 per cent. (four in cash and ten in stock) has been made from the income balance. This dividend amounts to $404,138; leaving a standing balance to the credit of the income account of $57,226 80. This large reserve has been deemed expedient on account of the late disaster to the Mayflower.

The road is rapidly approaching Chicago, and will be completed to that city early in the coming season. Cars are now running 30 miles west of Michigan city.

New York and Erie Railroad.

The receipts of this road for the month of December, 1851, were as follow:

From passengers and mail	$90,830 87
From freight	205,449 13
Total	296,280 00
Same month, 1850	149,985 15
Increase	146,294 85

The following are the gross receipts of this road for each month of the past year:

January	$144,909 30
February	125,105 20
March	163,400 99
April	189,149 51
May	174,345 12
June	224,722 44
July	228,469 33
August	263,964 13
September	306,888 96
October	356,553 21
November	299,420 40
December	296,280 00
Total	2,773,199 59

New York and Harlem Railroad.

The receipts of this road for the month of December, 1850 and 1851, were as follow:

December, 1851	$49,151 60
December, 1850	40,770 92
Increase	8,380 68

The opening of the road to Chatham will give it a much more extended area of traffic; and its extension to Troy will give it a connexion with the northern web of roads, which must prove of great value.

Northern Railroad.

The earnings of this road for the month of December were as follow:

December, 1851	$29,000 00
Earnings in December, 1850	17,000 00
Increase this year	12,000 00

Hudson River Railroad.

The earnings of this road for the month of December were - $112,000

COMMERCE OF NEW YORK.

EXPORTS FROM NEW YORK FOR 1851.

We have compiled from our record, corrected weekly from official entries at the custom-house, says the *Journal of Commerce*, the following statement of the quantity of some of the principal articles of produce exported from New York to foreign ports for the year 1851:

Ashes, pots	barrels	24,628
pearls		1,637
Beeswax	barrels	280,820
Wheat flour	do.	264,322
Rye flour		8,244
Corn meal		38,388
Wheat	bushels	1,408,465
Rye		13,162
Oats		5,282
Corn		1,605,674
Mould candles	boxes	37,932
Sperm candles		4,173
Coal	tons	11,298
Cotton	bales	280,645
Hay		6,775

Hops		302
Naval stores		192,240
Whale oil	barrels	1,122,818
Sperm oil	gallons	543,555
Lard oil		210,402
Linseed oil		7,972
Pork	barrels	47,482
Beef		40,147
Cut meats	pounds	3,427,104
Butter		2,196,538
Cheese		7,487,139
Lard		5,686,857
Rice	tierces	2[illegible],100
Tallow	pounds	2,221,258
Tobacco, crude	pkgs	19,195
manufactured	pounds	3,798,354
Whalebone		1,802,526

We also annex a comparison of the exports of a few articles for the past two years:

		1850.	1851.
Ashes, pots	barrels	20,522	24,628
pearls		4,619	1,637
Wheat flour		1,057,728	1,264,322
Wheat	bushels	690,856	1,468,465
Corn		2,471,871	1,605,674
Beef	barrels	47,413	40,147
Pork		71,107	47,482
Lard	pounds	6,476,743	5,686,857
Cotton	bales	304,861	289,645

NEW YORK CATTLE TRADE FOR 1851.

We present below, says the *Courier and Enquirer*, our regular annual statement of cattle at this market, by far the most important mart of the kind in this country.

It is proper to state here that it is difficult to ascertain, with precision, the exact amount of cattle sold yearly at the various drove-yards within the limits of the city, but it is believed that the figures, in the main, are essentially correct.

The largest number of beeves are sold at Washington Drove Yard, 44th street and 4th avenue; and next to that, Chamberlain's, down town. "Bull's Head," in Robinson street, does the most extensive business. Independently of these, however, there are large numbers of cattle disposed of elsewhere, throughout the city and at the boats, which are never taken into account. There are also many beeves slaughtered up the North river and brought down dressed to our city markets. A careful estimate, with the data before us, would put down the aggregate number of beef cattle annually consumed in this city at about 120,000 head.

The principal market for the sale of cows and calves, and sheep and lambs, is at George Browning's "Bulls Head," in 6th street, near 3d avenue; and next to that in importance, at the Hudson river (Chamberlain's). Many small sales, however, are made at the wharves, as above, on the North-river side of the city. The market days now are Mondays and Thursdays. About 400 beef cattle, on an average, are driven to the city weekly from Philadelphia. There are also occasional shipments to Bermuda, to supply the British naval contract.

Stock offered monthly.

	Beeves.	Cows and calves.	Sheep and lambs.
January	6,550	341	26,250
February	6,600	260	25,550
March	5,875	485	21,350
April	5,800	410	10,000
May	6,850	570	15,100
June	6,500	600	19,000
July	7,300	530	18,000
August	11,000	515	80,650
September	9,000	425	29,600
October	8,669	490	23,500
November	8,050	375	25,600
December	6,800	453	27,600
	88,994	5,466	264,200

Monthly Average of Prices.

	Beeves.	Cows and calves.	Sheep and lambs.
January	$5 50 a 8 00	$20 a 40 00	$2 00 a 5 00
February	6 00 a 8 50	22 a 42 00	2 00 a 5 00
March	6 00 a 8 50	25 a 40 00	2 25 a 6 50
April	6 00 a 9 00	20 a 41 50	3 00 a 7 00
May	7 00 a 9 00	20 a 42 00	2 25 a 4 25
June	6 00 a 8 00	20 a 45 00	1 64 a 4 00
July	6 00 a 8 00	20 a 44 00	1 75 a 4 25
August	6 00 a 7 25	20 a 43 00	1 50 a 4 50
September	6 00 a 7 50	20 a 40 00	1 59 a 4 00
October	6 25 a 7 50	24 a 42 50	1 75 a 5 00
November	6 00 a 8 00	20 a 48 00	1 30 a 4 00
December	8 00 a 8 25	22 a 35 50	1 50 a 7 00

Statement of Beef Cattle in the yards of the Washington Drove-yard for each month during the year 1850.

January	7,242
February	5,630
March	4,760
April	6,571
May	6,689
June	7,347
July	7,130
August	7,295
September	8,270
October	8,380
November	7,775
December	6,745
	83,835

The Washington Drove-yard commenced business on the 8th of May, 1848. The number of cattle offered from that time until

January 1, 1849, was	48,204
" 1850, "	78,200
" 1851, "	83,835
" 1852, "	88,934

From the above statement it will be seen that the cattle trade of this city is steadily and progressively increasing. An immense capital is involved in it, amounting to several millions of dollars annually.

ASHES.

Receipts, exports, stocks, and prices at New York, for fifteen years.

Years.	Receipts.	Exports.			Stock on hand Dec. 31.		Prices per 100 lbs.	
		Pot.	Pearl.	Total.	Pot.	Pearl.	Pot.	Pearl.
1837.....bbls.....	45,108	25,721	3,959	29,680	.....	.....	$6 75	$6 75
1838.....do.....	35,670	23,775	1,126	24,901	.....	.....	5 62½	6 37½
1839.....do.....	46,992	21,717	2,244	23,961	3,197	4,964	4 62½	5 12½
1840.....do.....	34,045	18,033	1,953	19,486	1,576	3,311	5 75	5 75
1841.....do.....	36,434	21,453	2,973	24,426	2,175	3,838	6 00	5 00
1842.....do.....	45,036	31,778	3,879	35,657	3,281	1,359	5 37½	6 00
1843.....do.....	79,000	43,041	2,584	45,625	6,617	7,677	4 62½	5 06¼
1844.....do.....	77,500	40,532	9,706	50,238	11,250	9,800	3 87½	4 25
1845.....do.....	69,000	46,724	9,567	56,291	12,295	7,127	3 81¼	4 25
1846.....do.....	46,500	29,914	4,909	34,823	3,495	2,349	5 12½	5 75
1847.....do.....	34,586	19,597	890	20,487	3,893	2,093	5 62½	7 50
1848.....do.....	37,200	18,637	1,576	20,213	2,247	1,489	6 00	6 25
1849.....do.....	45,786	25,242	3,236	28,478	3,605	5,163	6 56¼ to 6 62½	6 25 to 6 31¼
1850.....do.....	52,117	30,812	4,451	35,263	5,287	1,987	5 50 to 5 56¼	5 62½ to 6 68¾
1851.....do.....	31,287	22,219	2,396	24,615	1,509	313	4 87½ to 5 00	5 68¾

Receipts of Canada ashes for four years.

	bbls.
1848	6,679
1849	7,676
1850	12,389
1851	956

HIDES.—*Import of Hides into the port of New York from 1st January to 31st December, 1851.*

From—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total number.	Casks and bales.
Africa	3,250	.....	11,821	9,747	9,600	6,116	2,706	7,786	11,636	.....	2,244	10,409	75,315	.....
Angostura	28,299	.....	8,667	30,961	.....	14,279	34,338	36,475	30,372	27,163	26,680	20,313	257,547	.....
Buenos Ayres	31,538	55,091	51,161	13,175	22,745	32,014	24,834	19,380	12,523	36,714	36,208	26,621	362,004	.....
Do....kips	3,485	2,300	.....	.....	.....	.....	.....	.....	.....	2,070	481	3,500	11,836	.....
Do....salted	1,783	5,161	1,584	1,977	3,101	4,947	7,295	4,480	2,511	300	7,110	7,510	47,759	.....
Do....horse	2,728	1,500	500	2,266	.....	3,588	3,198	711	.....	1,254	.....	1,447	17,132	.....
British provinces	.....	.....	.....	.....	.....	.....	21	.....	.....	.....	.....	.....	21	.....
Calcutta, &c	594	.....	344	.....	.....	.....	2,423	.....	700	.....	600	.....	4,738	706
California	.....	.....	.....	.....	.....	1,658	.....	.....	.....	.....	.....	1,133	2,791	.....
Carthagena	3,195	4,236	1,688	1,360	.....	4,710	6,131	.....	1,927	3,247	3,301	2,227	32,022	.....
Central America	830	3,548	.....	941	5,338	3,208	1,444	846	3,146	2,575	1,452	.....	23,328	.....
Cork	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29
Curacoa	6,075	11,076	9,006	10,056	13,117	4,468	7,095	.....	2,016	3,846	.....	347	67,102	.....
Chili	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,558	.....	1,558	.....
Honduras	.....	.....	5	.....	.....	.....	.....	.....	.....	117	.....	.....	122	.....
Laguayra and Porto Cabello	3,926	.....	8,071	.....	5,413	6,578	1,872	275	886	4,132	.....	3,583	34,736	.....
Liverpool	.....	400	690	.....	525	.....	.....	280	200	.....	162	.....	2,257	272
London	.....	.....	159	.....	.....	.....	.....	.....	.....	.....	.....	.....	150	126
Maracaibo	2,084	2,811	277	1,159	2,240	1,601	602	2,419	1,200	3,645	.....	7,332	25,370	.....
Maranham and Para	6,172	52	.....	.....	2,200	.....	.....	.....	4,400	.....	.....	.....	12,824	.....
Mexico	2,086	455	2,851	1,114	.....	.....	.....	1,761	2,691	3,953	.....	278	15,189	.....
Rio Grande	9,529	.....	4,791	23,737	17,809	.....	.....	.....	9,100	5,540	10,863	13,482	94,951	.....
Do.....salted	.....	.....	.....	1,246	.....	.....	.....	.....	1,144	3,146	.....	.....	5,536	.....
Do.....horse	.....	.....	.....	349	70	.....	.....	.....	1,208	.....	.....	1,379	3,006	.....
Rio Janerio	.....	.....	.....	328	6,004	400	.....	.....	2,050	4,014	9,906	4,615	27,317	.....
Smyrna	.....	.....	.....	.....	.....	100	.....	.....	.....	.....	.....	.....	100	.....
West Indies	3,748	1,356	2,209	1,499	2,209	1,906	812	317	2,223	713	1,081	267	18,340	.....
Coastwise, from neighboring cities	3,945	.....	.....	.....	.....	241	233	2,169	10,152	4,518	3,380	1,022	25,660	.....

Import of Hides into New York—Continued.

From—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total number.	Casks and bales.
Dealers, chiefly purchases made in neighboring cities	9,683	10,256	7,647	7,002	1,560	1,753	5,817	6,500	15,003	8,902	6,549	16,343	97,015	303
New Orleans	2,700	1,560	4,183	6,394	5,071	1,841	3,523	929	.....	890	3,437	522	31,050	.....
Southern States	1,447	3,584	4,438	3,295	2,846	706	241	269	183	980	1,232	2,655	21,876	22
Texas	1,922	1,201	2,416	2,296	5,744	1,817	4,262	1,774	35	1,097	.....	1,382	23,946	.....
Total in 1851	129,119	104,587	122,499	118,842	105,592	91,931	106,847	86,371	115,306	118,893	116,244	126,367	1,342,598	1,458
Total in 1850	104,280	157,358	56,037	88,558	147,446	147,684	134,786	104,236	168,147	90,490	122,562	113,535	1,435,119	636
Total in 1849	70,969	65,431	112,604	135,448	114,141	70,502	155,260	75,127	46,200	146,584	65,166	170,004	1,227,436	847

COMMERCE OF BOSTON.

[From the New York Shipping List.]

IMPORTS FOR THREE YEARS.

Coffee.

	1851.	1850.	1849.
From—			
Batavia - - bags and piculs	61,014	49,774	45,094
Hayti - - - bags	71,969	59,433	55,823
Rio Janeiro - - do	13,343	3,452	22,206
Porto Cabello - - do	6,212	3,589	8,154
Manilla - - - do	1,676	943	4,018
Other foreign ports - do	5,359	6,392	7,853
Coastwise - - do	2,795	2,298	2,468
Total bags - - -	162,368	125,881	145,716

Fruit.

	1851.	1850.	1849.
Lemons - - - boxes	32,570	34,661	45,380
Oranges - - - do	108,877	65,043	77,500
Figs - - - drums	325,707	244,793	179,140
Figs - - - cases	2,114	1,523	906
Raisins - - - casks	28,374	20,678	13,743
Raisins - - - drums	5,518	4,883	5,150
Raisins - - - boxes	180,802	187,679	121,866

Goat Skins.

	Bales.	Number.
1851 - - - - - -	6,768	73,116
1850 - - - - - -	4,636	48,969
1849 - - - - - -	5,751	33,255

Coal.

	Tons.	Chaldrons.
FOREIGN.		
From Great Britain	8,487	148
Provinces, &c	–	30,183
Total—1851	8,487	30,330
1850	6,251	32,486
1849	12,062	34,531
COASTWISE.	Tons.	Bushels.
From Philadelphia	294,667	
Alexandria	14,290	
Other places	52,116	
Virginia	–	80,880
Total—1851	361,073	80,880
1850	289,571	52,375
1849	261 293	20,800

Fish.

	1851.	1850.
Salmon - - - - tierces	1,965	1,237
Salmon - - - - barrels	3,723	2,276
Salmon - - - - boxes	2,228	300
Herring - - - - barrels	6,311	7,441
Alewives - - - - -	8,308	4,595
Shad - - - - - -	127	83
Codfish - - - - quintals	11,185	1,789
Codfish - - - - casks	100	31
Codfish - - - - drums	530	
Pollock - - - - quintals	629	
From the Provinces—		Mackerel.
1851 - - - - - - barrels		43,329
1850 - - - - - - -		37,920
1849 - - - - - - -		41,826

Cocoa.

	Bags.
1851	4,131
1850	6,034
1849	6,038

Cotton.

	Bales.
From—	
New Orleans	102,449
Mobile	34,030
Charleston	18,491
Savannah	20,413
Apalachicola	20,147
Galveston	5,955
Other places	2,747
Total—1851	204,232
1850	195,076
1849	270,693

Flour.

	Barrels.
From—	
New York	84,450
Albany	31,673
Western railroad	242,463
Northern railroad	41,159
Fitchburg railroad	118,150
Boston and Main railroad	10,238
New Orleans	77,167
Fredericksburg	34,574
Georgetown	15,365
Alexandria	7,518
Richmond	43,983
Other ports in Virginia	5,281
Philadelphia	23,391
Baltimore	26,275
Other places	11,819
Total—1851	773,512
1850	761,148
1849	1,026,309

Grain.

	1851.	1850.	1849.
Corn - bushels	2,175,367	2,116,744	2,789,318
Oats - - -	496,911	339,801	449,324
Rye - - -	22,833	50,965	40,478
Shorts - - -	116,933	48,869	66,258
Wheat - - -	405,044	531,047	510,671

Hemp.

	Tons.	Bales.
From New Orleans—1851 - -	–	3,205
1850 - -	–	7,152
1849 - -	–	6,191
From Russia - - - -	642½	
Manilla - - - -	–	31,271
New Orleans - - -	–	13,205
Other places - - -	172	5,928
Total—1851 - -	814½	50,404
1850 - -	575	34,001
1849 - -	1,419	37,658

Leather, (Sole.)

	Sides.	Bundles.
From—		
New York and Albany - - -	191,502	207
Baltimore - - - - -	22,294	16,402
Philadelphia - - - -	11,250	7,994
Maine - - - - -	4,383	
Alexandria - - - -	–	326
Georgetown - - - -	–	271
New Orleans - - - -	212	3,849
Liverpool - - - - -	–	71
London - - - -	–	113
Halifax - - - - -	–	10
Sidney - - - - -	200	
Western railroad - - - -	180,301	26,951
Fitchburg railroad - - -	52,205	13,644
Northern railroad - - - -	12,759	4,424
Total—1851 - -	476,036	74,262
1850 - -	478,868	63,676
1849 - -	339,142	41,425

Iron.

	From Russia.	From Sweden.	From Great Britain.	Coastwise.
Bars - - No.	2,633	91,219	554,735	42,877
Bars - - tons	100	1,260	845	599
Railroad - - bars	–	–	16,522	104
Railroad - - tons	–	–	2,607	320
Bundles - - No.	17,550	11	166,380	25,811
Plates - - -	–	–	24,232	9,644
Blooms - - tons	–	–	118	122
Boiler - - -	–	–	39	
Scrap - - -	–	–	2,570	
Pig - - -	–	–	17,164	12,887

The total receipts have been—

	1851.	1850.	1849.
Bars - - - - No.	691,469	775,477	775,504
Bars - - - - tons	2,804	2,144	4,039
Railroad - - - bars	16,626	22,607	78,509
Railroad - - - tons	2,927	6,360	17,125
Bundles - - - No.	209,652	141,104	183,974
Plates - - - - -	33,876	19,938	13,479
Blooms - - - - -	–	4,677	4,177
Blooms - - - tons	240	–	469
Boiler - - - - -	39	50	
Scrap - - - - -	2,570	1,380	2,371
Pig - - - -	30,051	23,065	34,265

Sugars.

	1851.	1850.
From—		
Foreign ports - - - boxes	82,906	82,221
Domestic ports - - - -	1,922	4,389
Foreign ports - hogsheads and casks	11,571	10,486
Domestic ports - - - -	2,096	5,311
Foreign ports - - - bags	88,126	52,674
Domestic ports - - - -	–	638
Foreign ports - - - barrels	1,223	420
Domestic ports - - - -	4,620	7,601

Molasses.

	Hogsheads.	Tierces.	Barrels.
Foreign - - -	55,147	4,226	1,262
Coastwise - - -	26,265	306	2,359
Total—1851 - - -	81,412	4,531	3,621
1850 - - -	73,316	3,800	5,998
1849 - - -	72,545	3,662	3,342

Seeds, (Linseed.)

	1851.	1850.	1849.
From—			
Calcutta - - bags	170,881	97,154	74,737
Russia - - -	603	1,607	6,005
Sicily - - - -	–	3,949	1,236
Other places - - -	500	17	371
Total - - -	171,984	102,727	82,349

Tobacco.

	og sheads.	Bales.	Boxes & kegs.
1851 - - - -	2,691	3,663	41,794
1850 - - - -	2,161	4,946	35,179
1849 - - - -	2,691	8,350	27,089

Wool.

	Bales.	Quintals.
Domestic.		
1851 - - - - -	28,535	
1850 - - - - -	26,247	
1849 - - - - -	23,808	
Foreign.		
1851 - - - - -	26,656	17,856
1850 - - - - -	18,174	11,631
1849 - - - - -	14,815	6,000

Provisions.

	1851.	1850.
Beef - - - - barrels	32,365	38,042
Pork - - - - "	76,004	146,545
Hams - - - - casks	7,759	12,237
Hams - - - - barrels	3,559	4,841
Lard - - - - "	41,926	51,533
Lard - - - - kegs	21,013	60,915
Cheese - - - - boxes	88,292	88,574
Cheese - - - - casks	8,015	7,052
Cheese - - - - tons	730	749
Butter - - - - tubs	169,113	70,104
Butter - - - - barrels	546	778
Hogs - - - - No.	30,964	36,766

Saltpetre.

(Imported into the United States from Calcutta.)

	At Boston.	Other places.
1851 - - - - -	56,061	10,807
1850 - - - - -	76,839	11,357
1849 - - - - -	70,037	5,774

Lead.

	Pigs.
1851 - - - - - - -	249,088
1850 - - - - - - -	188,891
1849 - - - - - - -	180,365

COMMERCE OF PHILADELPHIA.

EXPORTS OF GRAIN.

We have prepared the following table, showing the exports of wheat and rye flour, cornmeal, wheat, and corn, from this port, annually, for the last twenty years:

Wheat Flour.

Years.	Barrels.	Years.	Barrels.
1831	259,785	1842	161,866
1832	151,917	1843	128,517
1833	132,622	1844	196,433
1834	87,905	1845	211,956
1835	96,098	1846	366,610
1836	67,113	1847	420,684
1837	33,680	1848	179,507
1838	69,622	1849	228,786
1839	191,380	1850	83,024
1840	284,774	1851	229,466
1841	195,555		

Rye Flour.

Years.	Barrels.	Years.	Barrels.
1831	8,433	1842	22,530
1832	13,040	1843	22,303
1833	27,939	1844	21,904
1834	23,795	1845	17,098
1835	21,038	1846	19,730
1836	27,429	1847	20,407
1837	17,276	1848	15,537
1838	14,211	1849	26,536
1839	24,527	1850	25,054
1840	36,471	1851	10,505
1841	26,866		

Cornmeal.

Years.	Barrels.	Years.	Barrels.
1831	45,432	1842	97,884
1832	50,323	1843	106,484
1833	51,903	1844	101,356
1834	50,018	1845	115,101
1835	50,869	1846	144,857
1836	42,798	1847	300,531
1837	63,803	1848	140,014
1838	64,002	1849	91,349
1839	73,800	1850	94,334
1840	89,486	1851	65,385
1841	108,822		

Wheat.

Years.	Bushels.	Years.	Bushels.
1831	61,282	1844	23,375
1832	2,258	1845	86,089
1835	2,903	1846	245,136
1839	37,831	1847	523,538
1840	280,047	1848	207,092
1841	56,571	1849	177,312
1842	87,953	1850	205,670
1843	32,235	1851	225,201

Corn.

Years.	Bushels.	Years.	Bushels.
1831	42,293	1842	83,772
1832	48,859	1843	74,613
1833	66,708	1844	110,068
1834	31,526	1845	129,256
1835	25,457	1846	279,820
1836	19,117	1847	1,102,210
1837	21,486	1848	817,150
1838	17,087	1849	906,823
1839	17,117	1850	602,680
1840	76,749	1851	554,545
1841	80,266		

THE SUPPLY OF CATTLE AT PHILADELPHIA FOR TEN YEARS.

Years.	Beeves.	Cows.	Swine.	Sheep.	Total.
1851	69,100	15,400	46,700	83,000	214,200
1850	68,750	15,120	46,900	82,500	313,270
1849	68,120	14,320	46,700	77,110	206,250
1848	67,211	14,108	47,690	76,820	205,829
1847	50,270	16,700	22,450	57,800	147,220
1846	47,500	14,480	18,670	55,810	136,460
1845	51,298	18,805	26,455	56,948	153,506
1844	45,732	18,519	25,420	51,056	143,727
1843	37,420	15,121	22,490	91,480	166,511
1842	34,293	13,270	21,265	89,559	158,385

VALUE OF IMPORTS AND DUTIES.

The following statement shows the value of the Imports annually into the port of Philadelphia, and the duties accruing to the United States from 1850 *to* 1851, *inclusive: carefully prepared from official documents:*

Year.	Value of imports.	Duties.
1830	$9,525,893	$3,537,516 10
1831	11,673,755	4,372,525 98
1832	10,048,195	3,500,292 50
1833	11,153,757	2,985,095 50
1834	10,686,078	2,110,477 32
1835	11,868,529	2,501,621 43
1836	16,116,625	3,146,458 43
1837	10,130,838	1,820,993 21
1838	10,417,815	2,109,955 30
1839	14,753,589	2,884,984 16
1840	8,624,484	1,517,206 70
1841	9,948,598	1,983,681 64
1842	6,201,177	1,812,842 82
1843	4,916,535	1,437,837 84
1844	8,410,864	2,981,573 15
1845	7,491,497	2,370,515 71
1846	8,308,615	2,608,068 16
1847	12,153,937	2,904,748 97
1848	10,700,865	2,767,459 13
1849	10,160,472	2,694,245 34
1850	13,381,759	3,412,239 68
1851 [only three-quarters, to Oct. 1]	12,795,440	3,673,123 80

CASH DUTIES.

The following is an official statement of the amount of Cash Duties received at the custom-house at this port during the past three years:

Months.	1851.	1850.	1849.
January - -	$426,233 10	$503,829 45	$210,041 55
February - -	329,056 70	147,484 60	284.924 55
March - -	368,994 90	315,063 92	329,873 60
April - -	277,612 45	222,042 80	149,644 10
May - -	297,988 00	253,940 72	142,413 83
June - -	259,604 50	215,684 30	155,687 76
July - -	506,113 00	452,331 60	311,437 30
August - -	423,487 75	465,679 25	397,702 75
September -	244,698 65	222,214 49	274,197 95
October - -	228,152 60	255,432 30	169,976 95
November -	171,041 25	159,328 35	131 615 45
December -	157,449 45	148,080 40	140,140 90
Total -	2,714,965 24	3,361,112 18	3,673,123 80

Number and class of vessels which have arrived at Port Richmond in the years 1851–'50–'49–'48.

[From the Philadelphia Commercial List.]

Months.	Ships.	Barques.	Brigs.	Schrs.	Sloops.	Boats.	Barges.	Steam'rs.	Total.
1851. January	.....	.....	.....	122	.....	.....	.....	.....	122
February	.....	.....	.....	146	.....	.....	.....	.....	146
March	.....	1	4	436	.....	.....	55	.....	496
April	.....	13	16	450	.....	.....	91	.....	570
May	.....	15	19	467	18	.....	92	.....	611
June	.....	6	20	464	15	.....	128	.....	633
July	.....	7	37	605	13	.....	221	.....	883
August	.....	8	111	713	28	.....	284	.....	1,144
September	2	17	92	376	29	.....	347	.....	863
October	1	13	103	619	46	.....	333	.....	1,115
November	.....	5	52	529	40	.....	372	.....	998
December	.....	7	13	250	13	.....	60	.....	393
Total	3	92	467	5,379	202	.....	1,983	.....	7,924
1850. January	.....	.....	1	58	1	.....	.....	.....	60
February	.....	.....	2	142	8	.....	.....	.....	152
March	.....	.....	3	214	11	.....	.....	.....	228
April	.....	.....	12	327	15	.....	.....	.....	354
May	.....	.....	17	411	20	.....	.....	.....	448
June	.....	2	21	387	26	.....	.....	.....	436
July	.....	.....	30	345	8	.....	.....	.....	383
August	.....	1	46	426	7	.....	.....	.....	480
September	.....	.....	26	370	5	.....	.....	.....	411
October	.....	.....	33	560	14	.....	.....	1	608
November	.....	.....	22	448	10	.....	.....	.....	480
December	.....	.....	5	289	17	.....	.....	.....	311
Total	.....	3	228	3,977	142	.....	.....	1	4,351
1849. January	1	.....	11	63	.....	2	.....	.....	77
February	1	4	10	62	5	6	.....	.....	88
March	.....	3	22	255	36	135	.....	.....	454
April	.....	3	22	269	41	171	.....	.....	506
May	1	2	40	419	61	258	.....	.....	781
June	.....	.....	42	393	6	.....	.....	.....	441
July	.....	1	33	305	7	.....	.....	.....	346
August	.....	1	47	354	5	.....	.....	.....	407
September	.....	3	51	376	17	.....	.....	.....	447
October	.....	.....	17	302	33	.....	.....	.....	352
November	.....	1	23	348	40	.....	.....	.....	412
December	.....	.....	11	167	7	1	.....	.....	186
Total	3	18	329	3,313	361	373	.....	.....	4,497
1848. January	.....	1	4	83	4	19	.....	.....	111
February	.....	1	11	98	19	29	.....	.....	158
March	.....	1	10	236	48	195	.....	.....	490
April	.....	1	31	458	57	606	.....	.....	1,153
May	.....	12	79	569	59	659	.....	.....	1,378
June	.....	8	93	632	39	628	.....	.....	1,400
July	.....	6	75	482	43	543	.....	.....	1,149
August	.....	8	71	500	33	565	.....	.....	1,177
September	.....	5	58	389	37	364	.....	.....	853
October	.....	4	41	354	49	576	.....	.....	1,024
November	.....	5	51	283	35	473	.....	.....	847
December	.....	.....	19	116	25	93	.....	.....	263
Total	.....	51	532	4,191	448	4,750	.....	.....	9,995

COMMERCE OF CINCINNATI.

[From the Cincinnati Price Current.]

Imports into Cincinnati, commencing September 1, 1851, and same time in 1850.

Articles.	Past week.	Total.	Last year.
Apples, green - - bbls	208	26,917	8,017
Beef - - - -	32	876	355
Do. - - - tcs	–	47	
Bagging - - pcs	–	–	
Barley - - bush	1,394	111,253	65,673
Beans - - - -	21	4,097	14,029
Butter - - bbls	151	2,866	2,146
Do. - firkins and kegs	178	7,816	6,298
Blooms - - tons	62	364	821
Bran, &c. - - sks	616	54,001	21,306
Candles - - bxs	–	70	117
Corn - - bush	10,346	230,831	198,457
Cornmeal - - -	126	1,933	1,303
Cider - - bbls	4	813	606
Cheese - - cks	6	27	4
Do. - - bxs	5,037	165,009	109,789
Cotton - - bales	8	2,388	1,210
Coffee - - sacks	904	23,341	26,584
Codfish - drums	–	15	146
Cooperage - - pcs	7,610	63,505	79,681
Eggs - - bxs and bbls	5	412	235
Flour - - bbls	4,177	151,954	173,736
Feathers - - sks	97	2,080	824
Fish, sundry - - bbls	18	1,958	486
Do. - - kegs and kits	–	58	338
Fruit, dried - - bush	122	7,033	4,405
Grease - - - bbls	–	182	132
Glass - - - bxs	974	20,767	19,547
Glass ware - - pkgs	248	12,194	8,166
Hemp - bdls and bales	33	4,123	4,029
Hides, loose - - -	569	6,964	6,760
Hides, green - - lbs	–	51,620	20,434
Hay - - - bales	58	2,362	4,954
Herrings - - bxs	–	2,343	1,471
Hogs - - - heads	10,762	77,817	46,102
Hops - - - bales	12	1,158	283
Iron and steel - - pcs	3,073	47,605	55,171
Do. - - bdls	1,308	13,474	29,547
Do. - - tons	–	3,297	55
Lead - - - pigs	1,391	19,676	20,962
Lard - - - bbls	948	5,702	3,555
Do. - - - kegs	–	991	5,319
Leather - - bdls	94	3,347	4,212

Imports into Cincinnati—Continued.

Articles.	Past week.	Total.	Last year.
Lemons - - bxs	–	91	245
Lime - - - bbls	500	21,486	19,851
Liquors hhds and pipes	3	267	664
Merch'dise and sundries pkgs	3,060	38,500	69,226
Merchandise - - tons	22	979	1,902
Molasses - - bbls	520	6,317	7,432
Malt - - - bush	680	12,473	4,158
Nails - - - kegs	1,516	15,782	26,191
Oil - - - bbls	124	1,956	2,363
Oranges - bxs and bbls	38	135	351
Oakum - - - bales	–	416	225
Oats - - - bush	68	43,302	52,531
Oil cake - - lbs	–	6,000	20,000
Pork and bacon - hhds	194	1,706	1,276
Do. - - tcs	–	35	95
Do. - - bbls	791	2,249	3,107
Do. - - bulk	40,580	896,311	369,102
Potatoes - - bbls	263	5,879	12,063
Pig metal - - tons	311	3,925	4,459
Pimento and pepper - bags	15	173	880
Rye - - - bush	160	14,254	8,176
Rosin, tar, &c. - - bbls	–	2,146	900
Raisins - - - bxs	874	8,191	8,752
Rope, twine, &c. - pkgs	–	189	487
Rice - - - tcs	60	97	176
Sugar - - - hhds	234	2,112	2,282
Do. - - - bbls	69	3,093	2,174
Do. - - - bxs	80	617	1,152
Seed, flax - - bbls	64	17,013	10,797
Do. grass - - -	274	1,493	512
Do. hemp - - -	–	25	16
Salt - - - sks	717	1,822	19,093
Do. - - - bbls	1,210	17,192	47,285
Shot - - - kegs	–	651	471
Tea - - - pkgs	124	3,412	1,414
Tobacco - - hhds	6	1,476	668
Do. - - - bls	5	423	744
Do. - - bxs & kgs	216	8,329	3,977
Tallow - - - bbls	13	1,015	1,014
Wines - - bbls & ¼ cks	–	380	1,356
Do. - - bkts & bxs	30	1,202	985
Wheat - - - bush	1,817	158,285	182,105
Wool - - - bales	2	452	481
Whiskey - - bbls	2,640	72,656	58,712
Yarns, cotton - - pkgs	150	1,237	1,990
Yarns - - bales	–	22,356	29,777

Exports from Cincinnati, commencing September 1, 1851, and same time in 1850.

Articles.	Past week.	Total.	Last year.
Apples, green - - bbls	26	5,725	4,159
Alcohol - - -	24	1,992	1,282
Beef - - - -	44	7,721	8,303
Do. - - - tcs	–	2,133	6,930
Beans - - - bbls	–	946	692
Brooms - - doz	75	1,331	2,872
Butter - - - bbls	124	565	930
Do. - firkins and kegs	232	8,633	13,633
Bran, &c. - - sks	–	–	1,944
Bagging - - pcs	100	3,653	3,909
Corn - - - sks	4,871	15,327	3,840
Cornmeal - - bbls	2	162	95
Cheese - - - sks	–	8	10
Do. - - - bxs	2,058	54,121	45,417
Candles - - -	2,794	26,872	25,214
Cattle - - - head	–	–	12
Cotton - - - bales	122	1,668	742
Coffee - - - sks	321	11,175	9,640
Cooperage - - pcs	621	20,698	21,555
Eggs - - - bbls	48	683	484
Flour - - - bbls	4,333	77,530	134,891
Feathers - - sks	26	2,218	884
Fruit, dried - - bush	24	87	2,620
Grease - - - bbls	12	1,025	894
Grass seed - - -	87	350	48
Horses - - - head	–	–	82
Hay - - - bales	–	54	32
Hemp - - - bales	12	433	450
Hides - - - lbs	–	19,924	
Do. - - - No	464	4,272	3,616
Iron - - - pcs	2,291	30,907	11,762
Do. - - - bdls	701	8,645	23,418
Do. - - - tons	10	2,450	1,846
Lard - - - bbls	147	7,927	4,412
Do - - - kegs	325	25,348	10,168
Lard oils - - bbls	81	4,780	7,104
Linseed oil - - -	57	1,761	2,335
Molasses - - -	516	7,471	4,583
Oil cake - - tons	–	377	361
Oats - - - sks	–	890	594
Potatoes, &c. - - bbls	755	5,521	3,313
Pork and bacon - hhds	107	4,358	2,353
Do. - - trcs	–	1,387	1,197
Do. - - - bbls	958	18,509	22,291

Exports from Cincinnati—Continued.

Articles.	Past week.	Total.	Last year.
Pork and bacon in bulk lbs	32,790	614,785	94,419
Rope, twine, &c. - pkgs	36	1,520	2,876
Soap - - - bxs	202	8,016	5,261
Sheep - - - head	–		
Sugar - - - hhds	267	3,316	2,204
Salt - - - bbls	148	10,307	14,216
Do. - - - sks	349	6,235	2,846
Seed, flax - - bbls	–	547	6
Sundry merchandise - pkgs	3,140	82,032	199,981
Do. do. - tons	–	2,240	4,063
Do. liquors - - bbls	466	7,831	4,517
Do. manfactures - pcs	–		9,405
Do. produce - - pkgs	1,729	19,989	6,739
Starch - - - bxs	16	4,252	3,314
Tallow - - - -	100	1,985	4,700
Tobacco - kgs and bxs	139	6,814	4,671
Do. - - - hhds	9	1,128	140
Do. - - bales	–	37	
Vinegar - - bbls	65	1,074	794
Whiskey - - -	3,598	59,153	52,843
Wool - - - bales	28	945	501
Do. - - - lbs	–		
White lead - - kgs	37	16,484	10,788
Castings - - pcs	266	4,233	16,908
Do. - - - tons	–	430	364
Pork - - - bxs	100	160	754

COMMERCE OF MILAN, OHIO.

Imports in 1851.

Articles.		Quantity.	Value.
Merchandise	pounds	2,677,095	$669,273
Dairy salt	sacks	1,755	219
Coarse do	barrels	5,407	5,745
Plaster	-	894	1,341
Whiskey	-	28	196
Fish	-	86	602
Water lime	-	403	806
Beer	-	86	516
Green apples	-	117	234
Barley	bushels	205	103
Coal	tons	305	1,220
Shingle wood	cords	180	2,160
Shingles	number	979,750	2,450
Lumber	feet	531,961	5,320
Total value			650,185

Exports in 1851.

Articles.		Quantity.	Value.
Wheat	bushels	258,778	$178,557
Corn	-	227,564	88,105
Oats	-	56,033	16,810
Pork	barrels	439	5,268
Beef	-	297	2,079
Dried fruit	-	43	276
Butter	-	4	60
Lard	-	3	80
High wines	-	1,402	10,164
Lumber	-	818,090	7,180
Eggs	barrels	66	317
Salt	-	21	43
Sweet potatoes	-	12	30
Flax-seed	-	19	100
Clover-seed	-	7	28
Flour	-	7,103	6,179
Sundries	-	28	180
Vinegar	-	6	30
Corn-meal	-	67	105
Oil-meal	-	20	50
Beer	-	15	90

Exports—Continued.

Articles.		Quantity.	Value.
Tallow		660	$9,900
Hickory-nuts		3	5
Ashes	casks	335	11,236
Butter	kegs	496	1,960
Lard		51	357
Sheep-pelts	barrels	78	1,950
Wool	pounds	265,162	1,950
Rags		28,070	561
Feathers		300	90
Hides	number	1,000	2,750
Leather	pounds	5,197	1,039
Grindstones		52,670	46
Merchandise		18,000	3,601
Furniture		26,160	2,316
Broom-corn		13,600	650
Shingle-wood		19	228
Shingles		270,000	675
Staves		1,456½	2,917
Total value		-	435,816

R. M. GORDON, *Collector.*

LAKE TRADE OF BUFFALO.

Lake Imports for the season of 1851.

Articles.		Quantity.
Flour	barrels	1,258,224
Pork	do	32,169
Beef	do	73,074
Ashes	do	13,509
Whiskey	do	66,524
Cornmeal	do	3,031
Seed	do	11,126
Eggs	do	11,396
Fish	do	7,875
Oil	do	6,003
Lead	pigs	28,713
Iron	tons	2,739
Coal	do	17,244
Hides	number	48,430
Horses	do	2,912
Cattle	do	8,211
Hogs	do	89,420
Sheep	do	14,120
Rags	bales	3,854
Paper	bundles	8,495
Feathers	sacks	3,935
Hair	bales	425
Wax	packages	314
Wheat	bushels	4,167,121
Corn	do	5,988,775
Oats	do	1,140,340
Barley	do	142,773
Rye	do	10,652
Butter	pounds	2,342,900
Cheese	do	4,907,800
Lard	do	4,798,500
Tallow	do	1,053,900
Bacon	do	7,951,300
Lumber	feet	68,006,000
Staves	number	10,519,000
Wool	bales	6,943
Pelts	do	4,644
Broom-corn	do	5,752
Hemp	do	3,023
Flax	do	568
Leather	rolls	8,186
Paint	barrels	5,464
Fire-brick	M	154
Grindstones	tons	5,292
Sand stones	boxes	620
Potatoes	barrels	5,838

Lake imports for 1851—Continued.

Articles.	Quantity.
Furs.....packages.	4,900
Deer-skins.....do....	3,878
Tobacco.....do....	3,603
Soap.....boxes..	304
Starch.....do....	3,469
Candles.....do....	4,307
Fruit.....barrels..	5,343
Sugar.....do....	23
Saleratus.....boxes..	814
Ship knees.....tons...	4,774
C. blocks.....number..	665
Laths.....M....	1,056
Shingles.....do....	6,110
Shingle-bolts.....cords...	473
Oars.....number..	38,880
Cedar.....cords..	685
Brooms.....dozen..	4,463
Copper.....tons...	645
Cement.....barrels..	1,409
Nails.....kegs...	1,779
Marble.....tons...	65
Ties.....number..	5,252
Wood.....cords...	82
Arrivals.....number..	4,597
Beans.....barrels..	1,280
Reapers.....number..	226
Glue.....barrels..	173
Nuts.....do....	908
Ginseng.....packages.	369
Oil-cake.....tons...	2,438
Axes.....boxes...	440
Hardware.....packages..	1,288
Glassware.....do....	4,657
Earthen-ware.....do....	427
Wooden-ware.....do....	1,137
Forks.....bundles..	229
Hoes.....do....	847
Shovels.....do....	293
Rakes.....do....	2,000
Snaths.....do....	833
Cotton.....bales...	1,131
Railroad iron.....bars...	27,672
Glass.....boxes..	1,239
Hubbs.....number..	1,000
Hoop-poles.....do....	1,280
Building-stone.....tons...	718
Sundries.....packages.	27,106
Clearances.....number..	4,358

EXPORTS FROM MILWAUKIE.

The following are some of the principal Exports from Milwaukie for 1850 and 1851, which we find in the Sentinel:

Articles.		1850.	1851.
Flour	barrels	100,017	101,811
Beef	do	1,426	2,649
Pork	do	476	3,050
Wheat	bushels	297,578	130,754
Barley	do	15,279	99,897
Corn	do	5,000	26,430
Oats	do	2,100	55,124
Wool	pounds	126,595	320,511

The following is a comparative statement of the amount of Lumber received for the last two seasons:

Articles.		1850.	1851.
Boards	feet	30,160,370	30,103,092
Shingles	number	17,001,000	15,180,750

GALENA EXPORTS.

A Statement of the Exports from Galena, Illinois, for 1851.

Articles.		Quantity.	Value.
Lead	pounds	33,082,190	$1,417,851
Flour	barrels	39,335	127,672
Corn	bushels	24,090	8,431
Oats	do	59,629	14,907
Barley	do	42,734	21,372
Wheat	do	350	210
Rye	do	390	195
Potatoes	do	14,000	8,400
Beans	do	510	767
Flaxseed	do	25	25
Pork	barrels	3,185	47,775
Lard	pounds	125,000	12,500
Bacon	do	312,568	35,256
Butter	do	87,618	10,852
Lime	barrels	1,168	992
Corn meal	do	171	342
Eggs	dozen	22,880	2,288
Hides and skins	number	9,326	14,125

Statement of Exports from Galena—Continued.

Articles.		Quantity.	Value.
Horses	number	800	$40,000
Neat cattle	do	1,500	30,000
Sheep	do	500	750
Hogs	do	250	1,500
Soap	boxes	900	2,022
Candles	do	1,200	3,800
Beef	barrels	32	348
Hay	tons	75	600
Total value			1,700,358

The total amount and value of Lumber, &c., received at Galena for the year 1851, were as follow:

Articles.		Quantity.	Value.
Lumber	feet	5,085,684	$50,856
Laths	number	89,100	2,45
Shingles	do	2,470,500	7,411
Log timber	feet	12,312	515
Wood	cords	4,245	12,735

THE EAST INDIA AND PACIFIC TRADE.

A correspondent of the "Boston Traveller" furnished a detailed statement of the East India and Pacific trade of th United States, of which we make a brief abstract. The following table will show the East India and Pacific port arrivals and clearances, for the whole United States, during the year ending December 31, 1851:

Ports.	Arrivals.	Clearances.
Boston	88	90
New York	119	54
Baltimore	41	12
New Bedford	5	
Salem	7	10
Philadelphia	2	
New Orleans	1	
Other ports	4	3
	*267	169
Last year	185	153
Increase this year	82	16

*Of these 267 arrivals, 182 vessels were owned in the New England States.

The arrivals and clearances from New York were:

Ports.	Arrivals.	Clearances.
Canton	40	10
Shanghae	18	2
Callao	16	1
Valparaiso	9	4
Manilla	9	2
Hong Kong	5	1
Calcutta	4	1
Batavia	3	13
Zanzibar	3	2
Mauritius	3	
Cape Town	1	3
Other ports	8	15
Total	119	54
Last year	69	51
Increase this year	50	3

These tables do not include the arrivals and clearances from and for California; which were:

Ports.	Arrivals.	Clearances.
New York	14	56
Boston	6	36
Baltimore	4	10
New Bedford	4	
Philadelphia	3	8
Providence	1	
Bath	1	
New London	1	
Savannah	1	
New Orleans	.....	5
Total	35	115

COFFEE AND SUGAR TRADE OF THE UNITED STATES.

[From the New York Shipping List.]

COFFEE TRADE, 1851.

Imports, Exports, Stock, estimated Consumption, &c., for the year ending December 31, 1851, (exclusive of California and Oregon.)

New York.	Bags.	Pockets, &c.	Casks.	Bbls.	Bales.	Value Jan. 1, 1852.	Value Jan. 1, 1851.
Brazil	255,548	.....	.....	.....	.....	8¼ a 9½	10 a 11¼
St. Domingo	77,176	.....	.....	.....	.....	7¾ a 8	10 a 10½
Porto Cabello	41,175	.....	.....	.....	.....	8½ a 9	10½ a 11¼
Maracaibo	36,473	.....	10	.....	.....	8½ a 9	11 a 11½
Laguayra and Porto Cabello	11,528	.....	.....	.....	.....	.....	.....
Laguayra	8,082	.....	.....	.....	.....	8¾ a 9	10¼ a 11½
Laguayra and Maracaibo	1,165	.....	.....	.....	.....	.....	.....
Coro, (Venezuela)	641	.....	.....	.....	.....	.....	.....
Bolivar city	688	.....	.....	.....	.....	8½ a 8¾	11 a 11⅛
Savanille	819	.....	.....	.....	.....	.....	.....
Carthagena	127	.....	.....	.....	.....	.....	.....
Santa Martha	82	.....	.....	.....	.....	.....	.....
Costa Rica	585	.....	.....	.....	.....	8½ a 9½	11½ a 11¾
Jamaica	5,541	.....	35	1,204	.....	9 a 9½	10 a 10¾
Cuba	5,045	.....	5	104	.....	8 a 8¾	10¼ a 11¼
Porto Rico	2,686	.....	29	12	.....	8 a 8¾	10 a 11¼
Batavia	.....	53,938	.....	.....	.....	11 a 11¾	12½ a 13
Rotterdam	11,914	.....	.....	.....	.....	.....	.....
Africa	620	.....	.....	.....	.....	.....	.....
Other foreign ports	86	.....	.....	.....	.....	.....	.....
From foreign ports	467,349	53,938	79	1,320	.....	.....	.....
Received coastwise	42,760	18,350	.....	.....	1,221	.....	.....
Total receipts	510,109	72,288	79	1,320	1,221	.....	.....

Imports, &c.—Continued.

		Bags, &c.
Total packages received in 1851		585,017
Add stock January 1, 1851		16,000
Total supply		601,017
Deduct export	23,708	
And stock January 1, 1852	93,500	
		117,208
Taken from this port for consumption and shipped coastwise in 1851		483,809
Or about 66,714,430 pounds.		
Total packages received in 1850		382,986
Add stock January 1, 1850		36,000
Total supply		418,986
Deduct exports	45,711	
And stock January 1, 1851	16,000	
		61,711
Taken from this port, for consumption, and shipped coastwise in 1850		357,275
Or about 48,589,400 pounds.		

Imports at New York from foreign and coastwise ports.

Years.	Bags, &c.	Exports.	Stock 31st Dec.
1850	382,986	45,711	16,000
1849	401,075	49,000	36,000
1848	418,003	31,594	24,000
1847	427,470	18,116	21,000

Statement of Imports and Exports.

Received—		Total packages.		Stock, January 1.		Exported.		Value, January 1.	
		1851.	1850.	1852.	1851.	1851.	1850.	1852.	1851.
At New York.									
Foreign ports	522,686	321,112	93,500	16,000	23,708	45,711			
At Boston.									
St. Domingo	71,969	–	–	–	–	–	–	8 *a* 8½	10¼ *a* 10¾
Java	61,014	–	–	–	–	–	–	10⅛ *a* 11½	11½ *a* 12¾
Brazil	13,343	–	–	–	–	–	–	7¼ *a* 8¾	11 *a* 12
Other foreign ports	13,247								
		159,573	125,881	32,000	6,000	22,998	28,536		
At Philadelphia.									
Laguayra	32,168								
Brazil	76,043	–	–	–	–	–	–	8 *a* 9½	9¼ *a* 11½
Other foreign ports	15,043	–	–	–	–	–	–	8 *a* 9	10¼ *a* 11½
		123,254	100,261	18,500	None.	6,063	6,088		
At Baltimore.									
Brazil	206,240								
Laguayra, &c.	21,081								
Other foreign ports	17,872								
		305,193	184,630	28,000	26,000	2,945	6,778		
At New Orleans.									
Brazil	5,096								
Cuba, &c	7,672	–	–	–	–	–	–	7⅛ *a* 8¼	10½ *a* 10¾
		342,768	295,397	92,600	31,000	71	4,006	–	9⅛ *a* 9¾
Received at other ports		49,566	27,295	8,100	4,185				
Tota		1,503,040	1,054,576	272,700	83,185	55,785	91,119		

Statement of imports and exports—Continued.

		Packages.
Receipts in United States in 1851		1,503,040
Add stock January 1, 1851		83,185
Total supply		1,586,225
Deduct exports in 1851	55,785	
And stock January 1, 1852	272,700	
		328,485
Taken for consumption in 1851		1,257,740
Or about 184,721,400 pounds.		
Receipts in the United States in 1850		1,054,576
Add stock January 1, 1850		101,900
Total supply		1,156,476
Deduct exports in 1850	91,119	
And stock January 1, 1851	83,185	
		174,304
Taken for consumption in 1850		982,172
Or about 134,539,736 pounds		

RECAPITULATION.

Consumption estimates—

	Pounds.
Taken from New York	59,363,030
" Baltimore	46,449,470
" New Orleans	45,128,960
" Philadelphia	14,031,500
" Boston	12,684,340
" other ports	7,064,160
Total	184,721,460

Stock, 1st January, 1852.

At New York, of Brazil, bags	43,000
" Java, pockets, &c.	27,500
" Laguayra and Maracaibo, bags	18,000
" other kinds, packages	5,000
Total at New York, packages	93,500
" New Orleans, of Brazil	92,600
" Baltimore, of Brazil	28,000
" Philadelphia, (mostly,) of Brazil	18,500
" Boston, (mostly,) of Java, in pockets	32,000
" other ports, (mostly,) of Brazil	8,100
Total, packages	272,700

In the foregoing estimate of consumption we have not included the *coastwise receipts* at the ports, they being already embraced in the calculation at the port where they were originally received.

NOTE.—The estimated consumption of the country for 1851, it will be seen, is about equal to 36½ per cent. over that of 1850; but it will be remembered that the importation of 1850 was much smaller than that of several previous years; that prices in 1850 ruled high, and the consumption was, in a great degree, limited, substitutes being used to a considerable extent; and at the close of that year the stock held by dealers was nearly exhausted.

SUGAR TRADE, 1851.

Imports, Exports, Stocks, and estimated Consumption of raw, clayed, &c., for the year ending December 31, 1851, (exclusive of California and Oregon.)

New York.	Hhds.	Tierces.	Barrels.	Boxes.	Bags.	Cases.
Cuba - - -	94,070	1,548	5,079	188,387	813	
Porto Rico - -	29,374	64	2,020			
St. Croix - -	1,236	–	38			
Brazil - - -	–	–	565	–	43,794	303
Manilla - - -	–	–	–	–	108,257	
Surinam - -	817	3	133			
Nassau, N. P. -	136	23	103			
Halifax - - -	–	–	–	–	2,090	
St. John, N. B. -	69	–	17			
Other foreign ports -	317	10	302	24		
Total foreign -	126,019	1,648	8,257	188,411	154,954	303
Texas - - -	1,576	–	235	102		
Louisiana - -	15,945	45	326			
Other coastwise -	3,758	13	35,920	3,384	13,733	
Total supply -	147,298	1,706	44,738	191,897	168,687	303
Exported - -	929	81	20	3,091		
	146,369	1,625	44,718	188,806	168,687	303
Add stock Jan. 1, '51	1,601	–	–	8,835	3,798	
Total supply -	147,970	1,625	44,718	197,641	172,485	303
Deduct stock Jan. 1, 1852 - -	7,582	–	–	13,512	26,105	303
Consumpt'n at N. Y.	140,388	1,625	44,718	184,129	146,380	

Or about 132,832 tons; of which foreign, imported direct, 120,599 tons. Same time last year, 104,071 tons; of which foreign, imported direct, 65,089 tons.

Received at New York, from foreign and coastwise ports, from 1st January to 31st December.

Year.	Hhds.	Tierces.	Barrels.	Boxes.	Bags.
1851 - -	147,298	1,706	44,738	191,897	168,687
1850 - -	116,848	1,311	35,019	132,814	61,260
1849 - -	128,417	1,404	21,105	63,557	93,938
1848 - -	108,703	2,258	19,946	120,354	90,088
1847 - -	87,861	779	17,765	144,898	24,255
1846 - -	67,238	577	7,242	85,744	37,652
1845 - -	88,268	1,626	17,039	22,958	38,771
1844 - -	62,881	513	11,075	106,918	35,689
1843 - -	59,003	331	9,896	50,549	38,417
1842 - -	54,495	75	13,048	58,012	60,533

Stock in New York January 1.

Year.	Hhds.	Boxes.	Bags.
January 1, 1852 - - - -	7,582	13,512	26,105
1851 - - - -	1,601	8,835	3,798
1850 - - - -	3,213	1,699	24,666
1849 - - - -	4,549	14,127	
1848 - - - -	2,262	2,500	
1847 - - - -	1,279	–	3,817
1846 - - - -	1,297		

Most of the barrels received from coastwise ports are refined sugar.

Receipts of foreign from 1st January, 1851, to 31st December, 1851.

Ports.	Hogsheads and tierces.	Barrels.	Boxes.	Bags.	Casks.
At New York	127,667	8,257	188,411	154,954	303
Boston	11,571	1,223	82,906	88,126	
Philadelphia	27,648	5,084	34,971	53,907	
Baltimore	17,044	2,542	3,597	8,310	
New Orleans	350	–	28,619	–	1,683
Other ports	6,168	321	11,071	5,320	
Total receipts	190,448	17,427	349,575	310,617	1,986
Add stock Jan. 1, 1851	3,525	–	20,261	7,102	
Total supply	193,973	17,427	369,836	7 ,719	1,986
Deduct export 1851	2,951	2,904	6,542	1,344	
	191,022	14,523	363,294	316,375	1,986
Deduct stock, January 1, 1852	9,367	–	31,446	27,425	303
Total consumption	181,655	14,523	331,848	288,950	1,683

Or about	201,405	tons.
Add crop of 1850–'51, Louisiana, Texas, &c., the bulk of which came to market in 1851, and assuming the stock in each year to be equal	120,331	"
Would make the total consumption in the United States from January 1, 1851, to December 31, 1851	321,736	"
Consumption of foreign in 1850	160,210	"
Add crop of Louisiana, Texas, Florida, &c., 1849–'50	141,592	"
Would make the total consumption of 1850	301,802	"
Excess in 1851	19,934	"

Stock at the different ports on the 1st of January.

Ports.	Hhds., &c.	Boxes.	Bags.	Cases.
1852.				
New York	6,141	13,512	26,105	303
Boston	774	10,013		
Philadelphia	1,852	7,541	1,320	
Baltimore	250			
New Orleans				
Other ports	350	400		
Total	9,367	31,466	27,425	303
1851.				
New York	1,213	8,835	3,798	
Boston	400	7,514	3,054	
Philadelphia	1,287	2,900	250	
Baltimore	600			
New Orleans	—	700		
Other ports	425	312		
Total	3,525	20,261	7,102	

The preceding statement we believe to be a correct exhibit of the quantity of raw, clayed, &c., sugar taken from the ports for consumption in the country. It will be observed we do not include the receipts of European refined sugar, being unable to obtain any reliable data for them; and we do not embrace in our exports any foreign or domestic refined sugar, having confined ourselves wholly to the descriptions noticed. The quantity of sugar made here from molasses is large, and the production of the maple tree the last season is estimated at 17,500 tons.

METEOROLOGY AND THE COTTON AND SUGAR CROPS.

The following valuable table is taken from Affleck's Rural Almanac for 1852, and was compiled by the editor from the records of the late Dr. Tooley and G. J. C. Davis, esq., of Natchez, and also from his own records.

Years.	White frost, latest in spring. Date.	Temperature at sunrise.	White frost, earliest in fall. Date.	Temperature at sunrise.	Date of first blooms.
1825	Feb. 15	42	Oct. 19	44	
1826	April 11	43	Nov. 18	41	
1827	Mar. 19	44	Nov. 30	38	
1828	Mar. 17	42	Nov. 12	44	
1829	Mar. 22	32	Nov. 1	43	
1830	Feb. 14	41	Oct. 20	44	
1831	Mar. 21	41	Oct. 20	40	
1832	Mar. 18	30	Nov. 9	36	
1833	Mar. 30	44	Nov. 20	44	
1834	Mar. 30	39	Nov. 20	41	
1835	Mar. 23	42	Nov. 10	46	
1836	Mar. 25	43	Nov. 22	44	
1837	April 9	44	Nov. 26	42	
1838	Mar. 18	43	Nov. 22	44	
1839	Mar. 6	37	Nov. 7	42	
1840	Mar. 31	41	Oct. 25	42	June 6
1841	Mar. 18	45	Oct. 23	38	June 10
1842	Feb. 22	42	Oct. 26	43	May 17
1843	April 1	44	Oct. 28	39	June 9
1844	Mar. 31	38	Nov. 19	41	May 25
1845	Mar. 21	42	Nov. 12	44	May 30
1846	April 14	43	Nov. 19	44	June 10
1847	Mar. 27	40	Nov. 19	42	May 30
1848	Mar. 14	43	–	–	June 1
1849	April 16	41	Nov. 8	41	June 6
1850	April 7	40	Oct. 26	36	June 24

Cotton and Sugar Crops—Continued.

When killed by frost.	Item of cotton crop.		Sugar crop of United States.	Year.
	Crop of United States.	Consumption of United States.		
	Bales.	Bales.	Hhds.	
				1825
	937,600	104,483	(1818—25,000)	1826
	712,000	120,593	(1822—30,000)	1827
	857,744	118,853	88,000	1828
	976,845	126,512	48,000	1829
	1,038,848	182,142	70,000	1830
	987,477	173,800	75,000	1831
	1,070,438	194,412	70,000	1832
	1,205,394	196,413	75,000	1833
	1,254,328	216,888	100,000	1834
	1,360,725	236,733	30,000	1835
	1,422,930	222,540	70,000	1836
	1,801,497	246,063	65,000	1837
	1,360,532	276,018	70,000	1838
	2,177,835	295,193	115,000	1839
	1,634,945	297,288	87,000	1840
October 26	1,683,574	267,850	90,000	1841
October 23	2,378,875	325,714	140,000	1842
November 1	2,030,409	346,744	100,346	1843
October 28	2,394,503	389,000	200,090	1844
October 29	2,100,537	422,597	186,650	1845
November 3	1,778,651	427,627	140,000	1846
October 19	2,347,634	531,772	240,000	1847
November 26	2,728,596	518,039	220,000	1848
None	2,096,706	487,769	247,923	1849
December 3	2,355,257	404,108	211,203	1850

HOGS PACKED IN THE WEST.

[From the Cincinnati Price Current, February, 1852.]

Below we present a detailed statement of the hogs packed at the principal points in the West, including the returns given in the *Price Current* of 28th ultimo and 4th instant, with those received since the latter date.

The exhibit is more full and accurate than any we have been able to publish in former years; and although not embracing *every* point, it will answer all the purposes for which such a statement is useful.

The actual number cut up at St. Louis is less than our estimate, and we therefore correct the figures accordingly. This is also the case as regards Louisville, and we have besides found it necessary to make two or three corrections in the figures showing the number packed at other smaller points.

With regard to the business at Louisville we would remark that no detailed statement has been published since the close of the season; and, in the absence of such reliable information, we add three thousand on to the lowest estimate; making the number 193,000, which is 4,000 less than indicated by the figures previously given, the latter being, we believe, the highest estimate.

We give the several States in order, commencing with

OHIO.

Where packed.	1851–'52.	1850–'51.
Cincinnati	362,048	334,529
Chillicothe	42,000	21,000
Waynesville	4,480	5,800
Franklin	1,291	
Utica	90	45
Wilmington	1,000	3,000
Claysville	165	250
Higginsport	1,860	2,000
Centreville	517	440
Somerville	1,400	2,000
Hamilton	5,200	6,200
Westville	1,400	1,400
West Florence	800	800
Lebanon	2,400	7,000
Columbia	1,002	1,233
Manchester	270	600
Circleville	15,700	19,200
Harveysburg	1,100	1,500
Bellebrook	2,040	2,137
Ripley	9,500	8,000
West Union	.....	1,500
Aberdeen	500	1,500
Winchester	1,402	1,284
Troy	10,000	11,000
Waverly	6,000	11,000
Total	461,075	443,418

INDIANA.

Where packed.	1851–'52.	1850–'51.
Madison	97,202	96,349
Americus	800	800
Lafayette	38,600	33,000
Newport	3,700	4,800
Eugene	7,662	6,726
Connersville	16,281	10,000
Williamsport	4,775	5,450
Laurel	7,000	4,500
Centreville	4,400	
Dublin	2,200	1,700
Milton	1,681	2,000
Perrysville	2,886	3,624
Logansport	5,300	8,000
Terre Haute	62,651	65,548
Durkee's Ferry	4,200	5,000
Evansville	9,500	6,500
Vincennes	13,300	11,000
Lawrenceville	1,900	1,900
Paris	2,622	2,476
Covington	4,200	3,500
Cambridge city	13,000	18,119
Montezuma	1,675	2,900
Lawrenceburg	3,855	4,200
Vernon	846	2,050
Clinton	8,500	9,000
New Harmony	4,600	
Palestine	.....	757
Hutsonville	3,000	4,400
Carlisle	500	1,500
Merom	2,700	1,000
York	1,100	1,655
Darwin	300	1,200
Armiesburg	2,525	2,094
Attica	6,000	7,600
Peru	2,500	5,000
Wabashtown	900	1,000
Huntington	500	200
Jonesburg	600	
Crawfordsville	6,000	
Delphi	8,000	7,000
Lagro	1,800	1,500
Fort Wayne	.....	4,000
Total	359,761	348,754

ILLINOIS.

Where packed.	1851–'52.	1850–'51.
Naples	2,880	3,095
Springfield	10,000	8,000
Lacon	9,500	13,000
Peoria	17,000	26,000
Pekin	16,000	27,000
Canton	7,000	12,000
Macomb	3,000	5,000
Rushville	2,600	2,800
Beardstown	24,400	34,000
Lagrange	1,930	2,850
Meredocia	4,500	11,000
Greggsville	2,990	5,000
Pittsfield	1,500	2,500
Florence	900	2,390
Canton	8,671	13,601
Farmington	3,000	6,000
Liverpool	.....	2,400
Lewistown	1,500	2,000
Ellisville	800	2,000
Fairview	600	1,000
Peru	1,400	4,000
Quincy	17,500	24,500
Alton	25,000	20,000
Hennepin	800	2,000
Perry	2,000	2,500
Linville	800	1,500
Winchester	3,500	4,000
Vermont	1,000	2,900
Princeton	2,000	3,500
Chillicothe	.....	4,000
Warsaw	2,000	7,000
Total	174,671	257,536

IOWA.

Where packed.	1851–'52.	1850–'51.
Burlington	10,000	25,000
Keokuk	10,000	30,000
Muscatine	7,500	15,500
Total	27,500	70,500

KENTUCKY.

Where packed.	1851–'52.	1850–'51.
Louisville	193,000	196,414
Maysville	6,300	9,500
Total	199,300	205,914

MISSOURI.

Where packed.	1851–'52.	1850–'51.
St. Louis	47,168	82,274
Hannibal	9,000	17,000
Churchville	2,000	8,000
Total	58,168	107,274

Recapitulation.

Where packed.	1851–'52.	1850–'51.
Ohio	461,075	443,418
Indiana	359,761	348,754
Illinois	174,671	257,536
Iowa	27,500	70,500
Missouri	58,168	107,274
Kentucky	199,300	205,914
Green and Cumberland rivers	8,500	24,000
Total	1,288,975	1,457,396
		1,288,975
Deficiency		168,421
West of White river		2,000
Bedford, Indiana		6,600
Shawneetown and Grayville		5,000
Total deficiency		182,021

There are some points in Iowa and Missouri to hear from, and these returns we will give hereafter, as soon as received in a reliable shape.

As we remarked in a previous number of the *Price Current*, most of the above returns were received from our correspondents at the several points; and, while we do not claim for the figures entire accuracy, we believe the statements upon the whole to be as correct as it is possible to obtain.

Since writing the above, we have received the following additional return:

Chicago, Illinois, 1851–'52, 13,000; 1850–'51, 20,000.

THE OIL TRADE.

The "New Bedford Shipping List" says the amount of tonnage employed in the trade has been considerably increased during the last year, in spite of numerous losses in the Arctic seas. The number of vessels employed in the service at present is as follows, viz: 558 ships and barques, 27 brigs, and 5 schooners; being an increase over last year of 56 ships, 3 brigs, and 8 schooners. This number is large, but it still falls below that of 1846, when there were 678 ships, 35 brigs, and 22 schooners in the trade. From the best estimate we can make, the amount during the present year will hardly exceed 100,000 barrels, and may fall considerably below that figure. In addition to this, the accounts from the sperm whale fishery are not encouraging, and there is a probable prospect that importations for a year to come will not exceed 65,000 barrels.

Stock of Sperm and Whale Oil on hand, January 1, 1852.

Places.	Sperm.	Whale.
New Bedford	7,500	19,500
Fairhaven	1,850	4,500
Mattapoisett	500	.....
Westport	3,400	.....
Nantucket	4,000	2,200
Edgartown	.....	1,300
Other places, (estimated)	.....	9,000
	17,250	36,500

The following table will show the amount of Oil and Whalebone on hand from 1851 *to* 1845, *inclusive.*

Year.	Sperm.	Whale.	Bone.
January 1, 1851.....	3,610	14,062	242,000
1850.....	3,760	13,000	440,000
1849.....	10,147	20,936	994,600
1848.....	5,636	29,126	921,500
1847.....	14,613	7,775	112,800
1846.....	40,701	5,221	211,000
1845.....	32,992	11,950	Unknown.

The number of vessels and amount of tonnage employed in the Whale-fishery since 1844, *have been as follow:*

Year.	Ships and Barques.	Brigs.	Schooners.	Tonnage.
January 1, 1850.....	510	20	13	171,484
1849.....	581	21	12	196,110
1848.....	621	22	16	210,603
1847.....	610	31	21	230,218
1846.....	673	35	22	233,189
1845.....	643	35	17	218,655
1844.....	595	81	9	200,147

THE ANTHRACITE COAL TRADE.

[From the Philadelphia Commercial List.]

Table showing the quantity of Coal sent to market annually, from its commencement, in 1820, *to* 1850, *inclusive.*

Years.	Total Lehigh.	Schuylkill.	Little Schuylkill.	Total Schuylkill.	Lackawanna.	Pine Grove.	Lyken's Valley.	Shamokin.	Wyoming.	Total supply.	Increase and decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1820	365	.....	.....	.....	.....	.....	.....	.....	.....	365	.....
1821	1,073	.....	.....	.....	.....	.....	.....	.....	.....	1,073	708*
1822	2,441	.....	.....	.....	.....	.....	.....	.....	.....	2,440	1,167*
1823	5,823	.....	.....	.....	.....	.....	.....	.....	.....	5,823	3,583*
1824	9,541	.....	.....	.....	.....	.....	.....	.....	.....	9,541	3,748*
1825	28,396	6,500	.....	6,500	.....	.....	.....	.....	.....	34,896	25,355*
1826	31,280	16,767	.....	16,767	.....	.....	.....	.....	.....	48,047	13,151*
1827	32,074	31,360	.....	31,360	.....	.....	.....	.....	.....	63,434	15,387*
1828	30,232	47,284	.....	47,284	.....	.....	.....	.....	.....	77,516	14,082*
1829	25,110	79,972	.....	79,972	7,000	.....	.....	.....	.....	112,083	35,567*
1830	41,750	89,984	.....	89,984	42,700	.....	.....	.....	.....	174,734	62,351*
1831	40,966	81,854	.....	81,854	54,000	.....	.....	.....	.....	176,820	2,386*
1832	75,000	195,271	14,000	209,271	84,500	.....	.....	.....	.....	368,771	191,951*
1833	123,000	216,210	36,761	252,971	111,777	.....	.....	.....	.....	487,748	178,977*
1834	106,244	191,540	35,152	226,692	43,700	.....	.....	.....	.....	376,636	72,112†
1835	131,250	302,024	37,494	339,518	98,845	5,500	.....	.....	.....	515,103	198,467‡
1836	146,522	393,975	38,070	432,045	104,500	9,998	5,439	.....	.....	698,484	123,381*
1837	225,937	491,280	31,922	523,152	115,387	16,726	6,430	.....	.....	887,632	189,148*
1838	214,211	421,569	12,306	433,875	76,321	16,665	6,005	4,104	.....	746,181	141,451†
1839	222,042	333,927	8,249	442,176	122,300	19,227	5,372	11,930	.....	823,479	77,298*
1840	225,591	433,263	19,028	452,291	148,470	19,463	5,302	15,928	.....	867,045	43,566*
1841	142,807	543,280	41,412	584,692	192,270	15,306	6,176	22,154	.....	964,255	97,210

1842.....	271,913	491,602	26,831	541,504	205,253	31,437	181	10,098	47,346	1,107,732	143,477*
1843.....	267,125	647,308	30,005	677,313	227,605	22,879	.....	9,870	57,740	1,262,532	154,800*
1844.....	376,363	782,070	58,309	840,379	251,005	22,879	.....	13,087	114,906	1,623,459	360,927*
1845.....	430,993	1,008,901	76,122	1,085,023	266,072	27,719	.....	10,135	178,401	2,002,877	379,418*
1846.....	522,518	1,150,828	86,155	1,236,983	318,400	31,208	.....	12,646	188,003	2,333,494	330,617*
1847.....	643,568	1,467,499	105,345	1,572,844	388,200	55,346	.....	14,904	289,898	2,970,597	637,103*
1848.....	680,193	1,490,209	162,625	1,652,834	434,267	61,238	2,000	19,357	237,271	3,082,860	112,263*
1849.....	800,987	1,428,156	174,757	1,605,626	454,240	56,938	25,000	19,658	258,080	3,241,890	159,030*
1850.....	722,688	1,500,047	211,960	1,712,007	543,886	78,299	35,000	19,921	275,109	3,371,420	129,530*
1851.....	989,251	1,868,277	310,307	2,178,584	788,485	62,809	53,150	23,989	336,017	4,389,476	1,018,056*

* Increase. † Decrease. ‡ Including 20,000 from the Dauphin mine.

The total quantity of Coal shipped from the Lehigh coal mines annually, from the commencement of the trade, in 1820, to 1851, inclusive.

Years.	Lehigh Coal Company.	Beaver Meadow Company.	Hazleton Company.	Sugarloaf, now Diamond.	Buck Mountain Company.	Summit Spring Mountain.	Wilksbarre railroad.	Cranbury.	Total Lehigh.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1820	365								365
1821	1,073								1,073
1822	2,440								2,440
1823	5,823								5,823
1824	9,541								9,541
1825	28,396								28,396
1826	31,280								31,280
1827	32,074								32,074
1828	30,232								30,232
1829	25,110								25,110
1830	41,750								41,750
1831	40,966								40,966
1832	75,000								75,000
1833	123,000								123,000
1834	106,240								106,240
1835	131,252								131,252
1836	146,524								146,524
1837	192,289	33,617							225,937
1838	159,564	38,426	16,221						214,211
1839	142,071	36,595	33,826	7,550					222,042
1840	102,312	43,845	50,441	29,039	54				225,591
1841	*78,163	26,224	21,247	17,170					142,807
1842	163,742	45,159	31,082	31,930					271,913
1843	138,625	54,692	43,950	26,814	2,844				267,125
1844	219,245	70,335	70,168	2,866	13,749				376,368
1845	257,740	77,230	70,266	1,843	23,914				430,993
1846	274,663	85,870	98,109		46,103	17,908	5,865		522,513
1847	334,929	109,110	105,595		50,817	32,840	10,247		643,568
1848	336,569	84,930	86,641	6,391	71,101	65,531	10,425	18,605	680,193
1849	379,285	73,702	92,401	11,356	85,819	102,599	19,590	36,155	800,987
1850	424,258	27,571	54,309	12,099	103,937	43,793	32,153	24,568	722,688
1851	480,823	42,263	113,297	36,712	104,456	116,517	25,072	70,111	989,251

*Great freshet, which injured the canal.

STATISTICS OF THE MANUFACTURES OF THE UNITED STATES.

The subjoined summary of the manufacturing industry of the United States is derived from the Report of Mr. Kennedy, the Superintendent of the Census.

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The period which has elapsed since the receipt of the returns has been so short as to enable the Office to make but a general Report of the facts relating to a few of the most important manufactures.

If, in some instances, the amount of "capital invested" in any branch of manufacture should seem too small, it must be borne in mind, that when the product is of several kinds, the capital invested, not being divisible, is connected with the product of the greatest consequence. This, to some extent, reduces the capital invested in the manufacture of bar-iron in such establishments where some other article of wrought-iron predominates—sheet-iron, for example. The aggregate, however, of the capital invested in the various branches of wrought-iron will, it is confidently believed, be found correct.

The entire capital invested in the various manufactures in the United States, on the 1st of June, 1850—not to include any establishments producing less than the annual value of $500—

Amounted, in round numbers, to	$530,000,000
Value of raw material	550,000,000
Amount paid for labor	240,000,000
Value of manufactured articles	1,020,300,000
Number of persons employed	1,050,000

Cotton Goods.

States.	No. establishments in operation.	Capital invested.	Bales cotton.	Tons coal.	Value of all raw material.	No. hands employed.	
						Males.	Females.
Maine	12	$3,329,700	31,531	2,921	$1,573,110	780	2,959
New Hampshire	44	10,950,500	83,026	7,679	4,839,429	2,911	9,211
Vermont	9	202,500	2,243	- -	114,415	94	147
Massachusetts	213	28,455,630	223,607	46,545	11,289,309	9,293	19,437
Rhode Island	158	6,675,000	50,713	13,116	3,484,579	4,959	5,916
Connecticut	128	4,219,100	39,483	2,866	2,500,062	2,708	3,478
New York	86	4,176,920	37,778	1,539	1,985,973	2,632	3,688
New Jersey	21	1,483,500	14,437	4,467	666,645	616	1,096
Pennsylvania	208	4,528,925	44,162	24,189	3,152,530	3,564	4,099
Delaware	12	460,100	4,730	1,920	312,068	413	425
Maryland	24	2,236,000	23,325	2,212	1,165,579	1,008	2,014
Virginia	27	1,908,900	17,785	4,805	828,375	1,275	1,688
North Carolina	28	1,058,800	13,617	- -	531,903	442	1,177
South Carolina	18	857,200	9,929	- -	295,971	399	620
Georgia	35	1,736,156	20,230	1,000	900,419	873	1,399
Florida	-	80,000	600	- -	30,000	28	67
Alabama	12	651,900	5,208	- -	237,081	346	369
Mississippi	2	38,000	430	- -	21,500	19	17
Louisiana							
Texas							
Arkansas	3	16,500	170	- -	8,975	13	18
Tennessee	33	669,600	6,411	3,010	297,500	310	581
Kentucky	8	239,000	3,760	720	180,907	181	221

Ohio	8	297,000	4,270	2,152	237,060	132	269
Michigan							
Indiana	2	43,000	675	300	28,220	38	57
Illinois							
Missouri	2	102,000	2,160	1,658	86,446	75	80
Iowa							
Wisconsin							
California							
District of Columbia	1	85,000	960	- -	67,000	41	103
Total	1,094	74,501,031	641,240	121,099	34,835,056	33,150	59,136

Cotton Goods—Continued

States.	Entire wages per month.		Average wages per mo.		Value of entire products.	Yards sheeting, &c., &c.	Sundries.
	Males.	Females.	Males.	Females.			
Maine - - -	$22,895	$35,973	$29 35	$12 15	$2,596,356	32,852,556	
New Hampshire -	75,713	124,131	26 00	13 47	8,830,619	113,106,247	149,700 lbs. yarn.
Vermont - -	1,460	1,861	15 53	12 65	196,100	1,651,000	53,050 "
Massachusetts -	212,892	264,514	22 90	13 60	19,712,461	298,751,392	353,660 "
Rhode Island -	92,282	76,656	18 60	12 95	6,447,120	96,725,612	1,902,980 lbs. thr'd & y'n.
Connecticut - -	51,679	41,060	19 08	11 80	4,257,522	51,780,700	950,000 lbs. yarn.
New York - -	48,244	35,699	18 32	9 68	3,591,989	44,901,475	2,180,600 "
New Jersey - -	11,078	10,487	17 98	9 56	1,109,524	8,122,580	2,000,000 "
Pennsylvania -	63,642	40,656	17 85	9 91	5,322,262	45,746,790	5,308,561 "
Delaware - -	6,326	4,926	15 31	11 58	538,439	3,521,636	533,000 "
Maryland - -	15,546	19,108	15 42	9 48	2,120,504	27,883,923	46,000 "
Virginia - -	12,983	11,791	10 18	6 98	1,486,384	15,640,107	1,755,915 "
North Carolina -	5,153	7,216	11 65	6 13	831,342	2,470,110	2,267,000 "
South Carolina -	5,565	5,151	13 94	8 30	748,338	6,563,737	1,348,343 "
Georgia - - -	12,725	10,352	14 57	7 39	2,135,044	7,209,292	4,198,351 "
Florida - - -	900	335	32 14	5 00	49,920	624,000	
Alabama - -	4,053	2,946	11 71	7 98	382,260	3,081,000	790,000 "
Mississippi - -	270	101	14 21	5 94	30,500	- -	171,000 "
Louisiana - -							
Texas - - -							
Arkansas - -	190	106	14 61	5 88	16,637	- -	81,250 "
Tennessee - -	3,394	3,730	10 94	6 42	510,624	363,250	2,326,250 "
Kentucky - -	2,707	2,070	14 95	9 36	273,439	1,003,000	725,000 "

Ohio - - -	2,191	2,534	16 59	9 42	394,700	280,000	433,000 "
Michigan - -							
Indiana - - -	495	386	13 02	6 77	44,200	- -	300,000 "
Illinois - - -							
Missouri - -	820	800	10 93	10 00	142,900	- -	13,260 bales batting.
Iowa - - -							
Wisconsin - -							
California - -							
Dist. of Columbia -	575	825	14 02	8 00	100,000	1,400,000	
Total - -	653,778	703,414	-	-	61,869,184	763,678,407	27,873,600 lbs. and bales.

States.	No. establishments in operation.	Capital invested.	Pounds of wool used.	Tons of coal.	Value of all raw material.	No. hands employed.	
						Males.	Females.
Maine	36	$467,600	1,438,434	- -	$495,940	310	314
New Hampshire	61	2,437,700	3,604,103	3,600	1,267,329	926	1,201
Vermont	72	886,300	2,328,100	- -	830,684	683	710
Massachusetts	119	9,089,342	22,229,952	15,400	8,671,671	6,167	4,963
Rhode Island	45	1,013,000	4,103,370	2,032	1,463,900	987	771
Connecticut	149	3,773,950	9,414,100	7,912	3,325,709	2,907	2,581
New York	249	4,459,370	12,538,786	- -	3,838,292	4,262	2,412
New Jersey	41	494,274	1,510,289	1,889	548,367	411	487
Pennsylvania	380	3,005,064	7,560,379	10,777	3,282,718	3,490	2,236
Delaware	8	148,500	393,000	45	204,172	122	18
Maryland	38	244,000	430,300	100	165,568	262	100
Virginia	121	392,640	1,554,110	357	488,899	478	190
North Carolina	1	18,000	30,000	- -	13,950	15	15
South Carolina							
Georgia	3	68,000	153,816	- -	30,392	40	38
Florida							
Alabama							
Mississippi							
Louisiana							
Texas	1	8,000	30,000	- -	10,000	4	4
Arkansas							
Tennessee	4	10,900	6,200	- -	1,675	15	2
Kentucky	25	249,820	673,900	- -	205,287	256	62

Ohio	130	870,220	1,657,726	2,110	578,423	903	298
Michigan	15	94,000	162,250	- -	43,402	78	51
Indiana	33	171,545	413,350	90	120,486	189	57
Illinois	16	154,500	396,964	987	115,367	124	54
Missouri	1	20,000	80,000	1,071	16,000	15	10
Iowa	1	10,000	14,500	- -	3,500	7	
Wisconsin	9	31,225	134,200	- -	32,630	25	
California							
District of Columbia	1	700	5,000	- -	1,630	2	
Total	1,559	28,118,650	70,862,829	46,370	25,755,988	22,678	16,574

Woollen Goods—Continued.

States.	Entire wages per month.		Average wages per month.		Value of entire products.	Yards of cloth manufactured.	Sundries.
	Males.	Females.	Males.	Females.			
Maine	$6,998	$3,697	$22 57	$11 77	$753,300	1,023,020	1,200 lbs. yarn.
New Hampshire	21,177	17,451	22 86	14 53	2,127,745	9,712,840	165,200 "
Vermont	16,712	8,388	24 46	11 81	1,579,161	2,830,400	
Massachusetts	141,533	70,581	22 95	14 22	12,770,565	25,865,658	749,550 "
Rhode Island	20,431	11,708	20 70	15 18	2,381,825	8,612,400	46,000 "
Connecticut	70,141	33,216	24 12	12 86	6,465,216	9,408,777	
New York	85,147	28,377	19 97	11 76	7,030,604	7,924,252	261,700 "
New Jersey	10,367	4,192	25 22	8 60	1,164,446	771,100	350,000 "
Pennsylvania	67,138	23,279	19 23	10 41	5,321,866	10,099,234	1,941,621 "
Delaware	2,293	312	18 79	17 33	251,010	152,000	
Maryland	4,875	1,189	18 60	11 89	295,140	373,100	
Virginia	8,688	1,883	18 17	9 91	841,013	2,037,025	398,705 "
North Carolina	270	105	18 00	7 00	23,750	34,000	
South Carolina							
Georgia	1,099	536	27 47	14 10	88,750	340,660	
Florida							
Alabama							
Mississippi							
Louisiana							
Texas	80	80	20 00	20 00	15,000	14,000	4,000 blankets.
Arkansas							
Tennessee	265	12	17 66	6 00	6,310	- -	2,220 hats.
Kentucky	3,919	689	15 30	11 11	318,819	878,034	

Ohio - - - -	18,191	3,250	20 14	10 90	1,111,027	1,374,087	65,000 lbs. yarn.
Michigan - - -	1,689	585	21 65	11 47	90,242	141,570	
Indiana - - -	4,122	630	21 81	11 05	205,802	235,500	104,000 "
Illinois - - - -	2,728	676	22 00	12 52	206,572	306,995	137,000 "
Missouri - -	480	65	32 00	6 50	56,000	12,000	6,000 prs. blankets.
Iowa - - - -	78	- -	11 14	- -	13,000	14,000	
Wisconsin - - -	562	- -	22 48	- -	87,992	36,000	74,350 lbs. yarn.
California - - -							
District of Columbia -	60	- -	30 00	- -	2,400	10,000	
Total. - - -	489,039	210,901	-	-	43,207,555	82,206,652	4,294,326 lbs. yarn.

PIG IRON.

State.	No. establishments in operation.	Capital invested:	Tons ore used.	Tons mineral coal.	Bushels coke and charcoal.	Value raw material, fuel, &c.
Maine	1	$214,000	2,907	-	213,970	$14,939
New Hampshire	1	2,000	500	-	50,000	4,900
Vermont	3	62,500	7,676	150	326,437	40,175
Massachusetts	6	469,000	27,909	-	1,855,000	185,741
Rhode Island						
Connecticut	13	225,600	35,450	-	2,870,000	289,225
New York	18	605,000	46,385	20	3,000,074	321,027
New Jersey	10	967,000	51,266	20,865	1,621,000	332,707
Pennsylvania	180	8,570,425	877,283	316,060	27,505,186	3,732,427
Delaware						
Maryland	18	1,420,000	99,866	14,088	3,707,500	560,725
Virginia	29	513,800	67,319	39,982	1,311,000	158,307
North Carolina	2	25,000	900	-	150,000	27,900
South Carolina						
Georgia	3	26,000	5,189	-	430,000	25,840
Florida						
Alabama	3	11,000	1,838	-	145,000	6,770
Mississippi						
Louisiana						
Texas						
Arkansas						
Tennessee	23	1,021,400	88,810	177,167	160,000	254,900
Kentucky	21	924,700	72,010	-	4,576,269	260,152

Ohio - - - - -	35	1,503,000	140,610	21,730	5,428,800	630,037
Michigan - - - - -	1	15,000	2,700	- -	185,000	14,000
Indiana - - - - -	2	72,000	5,200	- -	310,000	24,400
Illinois - - - - -	2	65,000	5,500	- -	170,000	15,500
Missouri - - - - -	5	619,000	37,000	55,180	-	97,367
Iowa - - - - -						
Wisconsin - - - -	1	15,000	3,000	- -	150,000	8,250
California - - - - -						
District of Columbia - - -						
Total - - - - -	377	17,346,425	1,579,309	645,242	54,165,236	7,005,289

Pig Iron—Continued.

States.	Number of hands employed.		Entire wages per month.		Average wages per month.		Tons of pig iron made.	Value of other products.	Value of entire products.
	Males.	Females.	Males.	Females.	Males.	Females.			
Maine	71	-	$1,562	-	$22 00	-	1,484	-	$36,616
New Hampshire	10	-	180	-	18 00	-	200	-	6,000
Vermont	100	-	2,208	-	22 08	-	3,200	-	68,000
Massachusetts	263	-	7,238	-	27 52	-	12,287	-	295,123
Rhode Island									
Connecticut	148	-	3,967	-	26 80	-	13,420	$20,000	415,600
New York	505	-	12,625	-	25 00	-	23,022	12,800	597,920
New Jersey	600	-	12,720	-	21 20	-	24,031	-	560,544
Pennsylvania	9,285	9	201,039	$46	21 65	$5 11	285,702	40,000	6,071,513
Delaware									
Maryland	1,370	-	27,595	-	20 14	-	43,641	96,000	1,056,400
Virginia	1,115	14	14,232	96	12 76	6 86	22,163	-	521,924
North Carolina	26	5	208	22	8 00	4 40	400	-	12,500
South Carolina									
Georgia	135	3	2,355	15	17 44	5 00	900	28,000	57,300
Florida									
Alabama	40	-	700	-	17 50	-	522	5,000	22,500
Mississippi									
Louisiana									
Texas									
Arkansas									676,100
Tennessee	1,713	109	21,958	558	12 81	5 11	30,420	41,900	604,037
Kentucky	1,845	10	37,335	47	20 23	4 70	24,245	10,000	

Ohio - - - -	2,415	-	59,129	-	24 48	-	52,658	-	-	1,255,850
Michigan - - - -	25	-	875	-	35 00	-	660	6,000		21,000
Indiana - - - -	88	-	2,290	-	26 00	-	1,850	-	-	58,000
Illinois - - - -	150	-	3,310	-	22 06	-	2,700	-	-	70,200
Missouri - - - -	334	-	8,112	-	24 28	-	19,250	-	-	314,600
Iowa - - - -										
Wisconsin - - -	60	-	1,800	-	30 00	-	1,000	-	-	27,000
California - - - -										
District of Columbia - -										
Total - - - -	20,298	150	421,435	784	-	-	564,755	259,700		12,748,777

CASTINGS.

States.	No. establishments in operation.	Capital invested.	Tons pig iron.	Tons of old metal.	Tons of ore.	Tons mineral coal.	Bushels coke and charcoal.
Maine	25	$150,100	3,591	245	- -	1,319	14,000
New Hampshire	26	232,700	5,673	500	- -	1,680	20,500
Vermont	26	290,720	5,279	274	- -	1,066	198,400
Massachusetts	68	1,499,050	31,134	3,361	- -	12,401	3,500
Rhode Island	20	428,800	8,918	- -	- -	4,670	4,000
Connecticut	60	580,800	11,396	337	- -	7,592	30,600
New York	323	4,622,482	108,945	3,212	- -	22,755	181,190
New Jersey	45	593,250	10,666	350	- -	5,444	175,800
Pennsylvania	320	3,422,924	69,501	819	- -	49,228	276,855
Delaware	13	373,500	4,440	- -	- -	4,967	
Maryland	16	359,100	7,220	- -	- -	5,000	30,000
Virginia	54	471,160	7,114	205	- -	7,878	71,600
North Carolina	5	11,500	192	- -	- -	- -	6,375
South Carolina	6	185,700	169	- -	2,800	- -	405,560
Georgia	4	35,000	440	- -	- -	100	9,800
Florida							
Alabama	10	216,625	2,348	- -	- -	- -	31,300
Mississippi	8	100,000	1,197	- -	- -	248	92,000
Louisiana	8	255,000	1,660	- -	- -	3,205	
Texas	2	16,000	250	- -	- -	250	
Arkansas							
Tennessee	16	139,500	1,682	- -	5,050	24,690	13,200
Kentucky	20	502,200	9,731	- -	- -	2,649	432,750

Ohio	183	2,063,650	37,555	1,843	2,000	30,006	355,120
Michigan	63	195,450	2,494	- -	- -	901	16,200
Indiana	14	82,900	1,968	5	- -	132	29,600
Illinois	29	260,400	4,818	50	- -	1,412	12,500
Missouri	6	187,000	5,100	200	- -	2,598	
Iowa	3	5,500	81	- -	- -	- -	200
Wisconsin	15	116,350	1,371	15	- -	595	2,700
California	1	5,000	75	- -	- -	25	
District of Columbia	2	14,000	545	- -	- -	80	
Total	1,391	17,416,361	345,553	11,416	9,850	190,891	2,413,750

Castings—Continued.

States.	Value raw material, fuel, &c.	No. of hands employed.		Average wages per month.		Tons castings made.	Value of other products.	Value of entire products.
		Males.	Females.	Males.	Females.			
Maine	$112,570	243	1	$29 00	$5 00	3,691	-	$265,000
New Hampshire	177,060	374	-	33 05	-	5,764	$27,700	371,710
Vermont	160,603	381	-	28 27	-	5,000	87,770	460,831
Massachusetts	1,057,904	1,596	-	30 90	-	32,074	-	2,235,635
Rhode Island	258,267	800	-	29 63	-	8,558	119,500	728,705
Connecticut	351,369	942	7	27 02	8 00	11,210	70,000	981,400
New York	2,393,768	5,925	-	27 49	-	104,588	-	5,921,980
New Jersey	301,048	803	-	24 09	-	10,259	-	686,430
Pennsylvania	2,372,467	4,782	1	27 55	6 00	57,810	661,160	5,354,881
Delaware	153,852	250	-	23 36	-	3,630	55,000	267,462
Maryland	259,190	761	-	27 50	-	6,244	80,000	685,000
Virginia	297,014	810	9	19 91	9 44	5,577	-	674,416
North Carolina	8,341	15	-	23 46	-	172	-	12,867
South Carolina	29,128	153	2	13 59	4 00	1,286	-	87,683
Georgia	11,950	39	-	27 43	-	415	-	46,200
Florida								
Alabama	102,085	212	-	30 05	-	1,915	-	271,126
Mississippi	50,370	112	-	37 91	-	924	2,800	117,400
Louisiana	75,300	347	-	35 60	-	1,570	4,000	312,500
Texas	8,400	35	-	43 43	-	200	15,000	55,000
Arkansas								
Kennessee	90,035	261	8	17 96	4 50	3,384	-	264,325
Tentucky	295,533	558	20	24 89	4 15	5,888	-	744,316

Ohio - - -	1,199,790	2,758	-	27 32	-	37,399	208,700	3,069,350
Michigan - -	91,865	337	-	28 68	-	2,070	25,616	279,697
Indiana - - -	66,918	143	-	25 74	-	1,757	- -	149,430
Illinois - - -	172,330	332	-	28 50	-	4,160	89,250	441,185
Missouri - - -	133,114	297	-	19 63	-	5,200	- -	336,495
Iowa - - -	2,524	17	-	32 35	-	71	2,600	8,500
Wisconsin - -	86,930	228	-	26 73	-	1,342	64,025	216,195
California - -	8,530	3	-	23 33	-	75	- -	20,740
Dist. of Columbia -	18,100	27	-	27 05	-	512	11,000	41,696
Total - - -	10,346,355	23,541	48	-	-	322,745	1,524,121	25,108,155

WROUGHT IRON.

States.	No. establishments in operation.	Capital invested.	Tons pig metal.	Tons blooms used.	Tons ore used.	Tons mineral coal.	Bushels coke and charcoal.
Maine							
New Hampshire	2	$4,000	145	- -	- -	- -	50,000
Vermont	8	62,700	750	525	2,625	- -	337,000
Massachusetts	6	610,300	7,030	- -	- -	11,022	78,500
Rhode Island	1	208,000	3,000	- -	- -	6,000	
Connecticut	18	529,500	7,081	1,644	- -	5,062	783,600
New York	60	1,131,300	8,530	- -	44,642	13,908	5,554,150
New Jersey	53	1,016,843	10,430	- -	14,549	4,507	1,994,180
Pennsylvania	131	7,620,066	163,702	20,405	- -	325,967	3,939,998
Delaware	2	15,000	510	60	- -	- -	228,000
Maryland	17	780,650	10,172	3,389	- -	10,455	246,000
Virginia	39	791,211	17,296	2,500	- -	66,515	103,000
North Carolina	19	103,000	- -	- -	4,650	- -	357,900
South Carolina							
Georgia	3	9,200	100	- -	- -	- -	76,600
Florida							
Alabama	1	2,500	120	- -	- -	- -	30,000
Mississippi							
Louisiana							
Texas							
Arkansas							
Tennessee	42	755,050	11,696	325	9,151	62,038	
Kentucky	4	176,000	2,000	1,600	- -	- -	280,000

Ohio	11	620,800	13,675	2,900	- -	22,755	466,900
Michigan							
Indiana	3	17,000	50	- -	3,150	- -	85,000
Illinois							
Missouri	2	42,100	1,204	- -	- -	9,834	
Iowa							
Wisconsin							
California							
District of Columbia							
Total	423	14,495,220	251,491	33,344	78,787	538,063	14,510,828

Wrought Iron—Continued.

States.	Value of raw material used.	No. hands employed.		Average wages per mo.		Tons of wrought iron made.	Value of other products.	Value of entire products.
		Males.	Females.	Males.	Females.			
Maine								
New Hampshire	$5,600	6	-	$32 00	- -	110	- -	$10,400
Vermont	66,194	57	-	31 05	- -	2,045	- -	163,986
Massachusetts	221,194	260	-	22 50	- -	6,720	- -	428,320
Rhode Island	111,750	220	-	26 00	- -	2,650	- -	222,400
Connecticut	358,780	374	-	31 59	- -	6,325	$5,000	667,560
New York	838,314	1,037	-	26 00	- -	13,636	195,000	1,423,968
New Jersey	320,950	593	-	27 78	- -	8,162	- -	629,273
Pennsylvania	5,488,391	6,764	7	27 68	$7 50	182,506	219,500	8,902,907
Delaware	19,500	50	-	24 19	- -	550	- -	55,000
Maryland	439,511	568	-	23 33	- -	10,000	- -	771,431
Virginia	591,448	1,295	-	23 62	- -	15,328	- -	1,254,995
North Carolina	28,114	173	14	10 37	5 28	850	- - -	66,980
South Carolina								
Georgia	5,986	26	1	11 35	5 00	90	- -	15,384
Florida								
Alabama	3,000	14	-	20 00	- -	100	- -	7,500
Mississippi								
Louisiana								
Texas								
Arkansas								
Tennessee	385,616	731	55	15 20	5 00	10,348	38,800	670,618
Kentucky	180,800	183	-	32 06	- -	3,070	- -	299,700

Ohio - - - - -	604,493	708	-	33 61	- -	14,416	- -	1,076,192
Michigan - - - -	4,425	22	2	27 45	4 00	175	- -	11,760
Indiana - - - -	24,509	101	-	30 00	- -	963	- -	68,700
Illinois - - - -								
Missouri - - - -								
Iowa - - - - -								
Wisconsin - - - -								
California - - - -								
District of Columbia - -								
Total - - - -	9,698,109	13,178	79	- -	- -	278,044	458,300	16,747,074

States.	Capital invested.	Quantities and kinds of grain, &c., consumed.						
		Bushels of barley.	Bushels of corn.	Bushels of rye.	Bushels of oats.	Bushels of apples.	Hogsheads of molasses.	Tons of hops.
Maine	$17,000	-	-	-	-	-	2,000	
Vermont	7,000	2,500	-	-	-	-	-	1
Massachusetts	457,500	80,000	19,400	26,600	-	-	35,130	29
Rhode Island	17,000	12,500	-	-	-	-	-	6
Connecticut	15,500	-	20,000	20,000	-	-	10	2
New York	2,585,900	2,062,250	1,647,266	909,067	6,707	60,940	24,500	581
New Jersey	409,655	103,700	254,000	58,400	-	409,700	-	42
Pennsylvania	1,719,960	550,105	1,483,555	517,180	24,700	51,200	10	263
Maryland	247,100	76,900	166,100	54,300	460	-	-	25
Virginia	100,915	20,000	250,700	62,680	450	-	-	14
North Carolina	21,930	-	64,650	4,700				
South Carolina	3,475	-	18,100					
Georgia	7,150	-	20,150	2,500	1,500			
Alabama	500	-	-	-	-	-	25	
Louisiana	8,500	10,000	-	-	-	-	-	10
Kentucky	168,895	65,650	551,350	30,520	-	5,000	-	18
Tennessee	66,125	3,000	258,400	5,480				
Missouri	298,900	124,440	309,200	24,900	-	-	-	31
Ohio	1,262,974	330,950	3,588,140	281,750	19,500	-	-	178
Indiana	334,950	118,150	1,417,900	48,700	1,000	-	-	18
Illinois	303,400	98,000	703,500	48,700	2,200	-	-	30
Michigan	139,425	32,030	212,300	19,150	-	-	-	16

Iowa - - - -	19,500	- -	51,150	7,200								
Wisconsin - - - -	98,700	91,020	29,900	9,200	-	-	-	-				
New Mexico - - - -	7,300	- -	2,000	12,900								28
Utah - - - -	3,000	1,000										
District of Columbia -	12,000	5,000	- -	- -	-	-	-	-				2
Total - - -	8,334,254	3,787,195	11,067,761	2,143,927	56,517	526,840	61,675	1,294				

Malt and Spirituous Liquors—Continued.

States.	Hands employed.	Quantities of liquors produced.		
		Barrels of ale, &c.	Gallons of whiskey and high wines.	Gallons of rum.
Maine	5	-	-	220,000
Vermont	2	800		
Massachusetts	131	25,800	120,000	3,786,000
Rhode Island	9	3,900		
Connecticut	20	-	130,000	1,200
New York	1,380	644,700	9,231,700	2,488,800
New Jersey	197	34,750	1,250,530	
Pennsylvania	911	189,581	6,548,810	1,500
Maryland	126	26,380	787,400	
Virginia	123	5,500	879,440	
North Carolina	75	-	153,030	
South Carolina	33	-	43,900	
Georgia	15	-	60,450	
Alabama	2	-	-	3,000
Louisiana	8	3,000		
Kentucky	274	19,500	1,491,745	
Tennessee	159	-	657,000	
Missouri	179	44,850	939,400	
Ohio	1,033	96,943	11,865,150	
Indiana	287	11,005	4,639,900	
Illinois	274	27,925	2,315,000	
Michigan	98	10,320	690,900	

Iowa - - - - - -	19	- -	160,600	
Wisconsin - - - - - -	98	31,320	127,000	
New Mexico - - - - - -	21	- -	42,000	
Utah - - - - - -	3	300		
District of Columbia - - - -	5	1,350		
Total - - - - -	5,487	1,177,924	42,133,955	6,500,500

TANNERIES IN THE UNITED STATES

States.	No. of establishments.	Capital invested.	No. of hides and skins.		Value of raw material.
			Hides.	*Skins.	
Maine	213	$732,747	316,334	81,350	$892,343
New Hampshire	163	441,975	166,579	109,595	543,779
Vermont	152	346,250	125,052	44,330	357,946
Massachusetts	246	1,377,725	750,220	293,000	2,311,178
Rhode Island	10	42,900	10,571	14,861	40,615
Connecticut	115	360,500	122,455	67,110	453,854
New York	942	5,025,143	1,707,862	871,894	6,065,221
New Jersey	133	572,857	101,485	120,731	423,537
Pennsylvania	1,039	3,540,318	926,450	293,798	3,169,309
Delaware	16	99,350	26,050	12,950	99,620
Maryland	116	628,900	169,585	68,810	725,612
Virginia	341	676,983	189,200	74,573	498,926
North Carolina	151	251,055	77,805	24,035	191,237
South Carolina	91	184,335	55,000	13,830	131,679
Georgia	140	262,855	81,481	21,705	185,604
Florida	4	9,400	2,100	1,200	4,300
Alabama	149	200,570	79,033	13,922	158,247
Mississippi	92	145,615	52,315	9,730	111,474
Louisiana	15	35,800	10,500	2,850	26,440
Texas	22	33,850	9,350	1,750	18,624
Arkansas	51	42,100	16,450	3,851	35,230
Tennessee	394	490,320	166,944	43,429	396,159
Kentucky	275	763,455	196,200	69,380	537,147

Ohio	706	1,340,389	344,280	228,493	1,118,080
Michigan	60	236,000	72,365	23,600	203,450
Indiana	358	514,897	141,549	57,070	405,838
Illinois	96	188,373	50,825	21,575	129,907
Missouri	148	228,095	120,667	44,493	247,956
Iowa	14	20,350	5,340	850	10,745
Wisconsin	8	78,950	29,800	14,900	93,380
New Mexico	1	500	120	- -	200
District of Columbia	2	25,000	5,000	4,200	25,600
Total	6,263	18,900,557	6,128,970	2,653,865	19,613,237

[* There are about 6,000,000 sheep, goat, and other small skins tanned and dressed annually, which are not included in the above table.

Tanneries in the United States—Continued.

States.	Hands employed.		Monthly wages.		No. of sides of leather, skins, &c., produced.		Value.
	Males.	Females.	Males.	Females.	Skins.	Sides of leather.	
Maine	787	3	$17,229	$28	81,350	632,668	$1,620,636
New Hampshire	502	-	11,737	-	109,595	333,158	900,421
Vermont	397	-	8,807	-	44,330	250,104	587,466
Massachusetts	1,510	32	41,245	368	293,000	1,500,440	3,519,123
Rhode Island	38	-	829	-	14,861	21,142	75,040
Connecticut	407	-	10,027	-	67,110	244,910	731,000
New York	4,914	31	103,171	293	871,894	3,415,724	9,804,000
New Jersey	405	-	8,946	-	120,731	202,970	724,466
Pennsylvania	2,978	2	54,784	17	293,798	1,852,900	5,275,492
Delaware	108	-	2,533	-	12,950	52,100	163,742
Maryland	479	-	8,034	-	68,810	339,170	1,103,139
Virginia	900	6	13,643	62	74,573	378,400	894,877
North Carolina	372	1	5,291	4	24,035	155,610	352,535
South Carolina	264	-	3,667	-	13,830	110,000	261,332
Georgia	402	-	7,107	-	21,705	162,968	361,586
Florida	12	-	189	-	1,200	4,200	9,200
Alabama	457	5	7,700	45	13,922	158,066	335,911
Mississippi	266	3	4,924	25	9,730	104,630	229,407
Lonisiana	51	3	930	22	2,850	21,000	55,025
Texas	63	1	1,007	10	1,750	18,700	52,050
Arkansas	110	-	1,814	-	3,851	32,900	78,774
Tennessee	915	6	14,338	32	43,429	333,888	746,484

Kentucky - - -	877	2	14,417	9	69,380	392,400	985,267
Ohio - - -	1,826	-	35,830	-	228,493	688,560	1,964,591
Michigan - - -	265	-	6,782	-	23,600	144,730	363,980
Indiana - - -	836	2	15,199	14	57,070	283,098	714,813
Illinois - - -	240	-	5,145	-	21,575	101,650	244,028
Missouri - - -	412	5	8,306	41	44,493	241,334	466,241
Iowa - - - -	28	-	543	-	850	10,680	24,520
Wisconsin - - -	75	-	1,710	-	14,900	59,600	175,710
New Mexico - - -	3	-	60	-	- -	240	940
District of Columbia - -	10	-	270	-	4,200	10,000	40,000
Total - - -	20,909	102	416,214	970	2,653,865	12,257,940	32,861,796

VII.

METEOROLOGICAL TABLES.

EXTRACT FROM THE METEOROLOGICAL REGISTER AT FORT SNELLING, MINNESOTA TERRITORY.

By P. Prescott.

Year.	Month.	Monthly mean of thermometer.	Quantity of rain during the month.
		Degrees.	Inches.
1843	May	52.25	3.12
	June	62.98	5.22
	July	69.90	2.09
	August	66.56	1.84
	September	57.95	5.14
	October	37.24	0.50
	November	26.61	1.43
	December	23.14	0.27
1844	January	10.46	1.50
	February	23.44	0.72
	March	33.61	0.97
	April	52.13	0.00
	May	55.88	4.50
	June	62.50	1.64
	July	69.58	4.80
	August	64.74	4.37
	September	55.45	4.26
	October	42.22	0.97
	November	29.41	0.77
	December	18.17	0.58
1845	January	20.64	0.49
	February	26.35	1.40
	March	35.14	2.80
	April	47.50	3.15
	May	60.38	1.51
	June	67.83	6.80
	July	74.93	2.56

Extract—Continued.

Year.	Month.	Monthly mean of thermometer.	Quantity of rain during the month.
		Degrees.	Inches.
1845	August	69.66	3.28
	September	60.56	2.21
	October	46.87	0.66
	November	30.85	0.40
	December	14.85	0.08
1846	January	29.98	0.52
	February	20.33	0.02
	March	39.20	1.71
	April	46.98	2.90
	May	63.56	2.00
	June	67.26	3.10
	July	74.50	4.95
	August	74.22	3.80
	September	63.38	2.23
	October	46.33	2.45
	November	40.71	2.10
	December	22.50	0.21
1847	January	5.32	0.29
	February	20.67	0.11
	March	24.32	0.44
	April	46.60	0.45
	May	52.00	4.96
	June	65.38	2.66
	July	72.56	3.66
	August	67.06	2.49
	September	58.56	4.00
	October	47.77	0.37
	November	31.23	1.71
	December	17.37	0.66
1848	January	17.93	0.62
	February	20.27	1.13
	March	28.64	1.71
	April	44.93	0.15
	May	60.66	5 28
	June	67.75	2.83
	July	67.01	4.60
	August	67.56	3.19
	September	54.58	2.46
	October	47.90	0.62
	November	26.01	0.09
	December	7.15	0.15

Extract—Continued.

Year.	Month.	Monthly mean of thermometer.	Quantity of rain during the month.
		Degrees.	Inches.
1849	January	7.02	0.10
	February	8.04	0.20
	March	26.24	4.11
	April	37.30	5.20
	May	60.07	5.97
	June	64.20	2.60
	July	63.22	4.13
	August	64.21	5.42
	September	61.05	2.52
	October	47.24	5.25
	November	42.06	1.48
	December	9.20	1.95
1850	January	14.00	1.67
	February	18.30	0.83
	March	24.20	2.23
	April	47.05	2.60
	May	55.09	0.57
	June	71.02	4.62
	July	76.63	6.15
	August	74.29	2.97
	September	60.80	1.82
	October	49.43	0.32
	November	33.73	1.68
	December	12.54	0.04
1851	January	15.29	0.20
	February	22.67	0.13
	March	39.91	1.23
	April	49.13	2.68
	May	56.83	3.96
	June	66.31	2.15
	July	75.46	2.60
	August	68.40	3.29
	September	- -	3.64

Meteorological observations made near Laphamsville, Kent county, Michigan, 1851.

By W. E. Wetmore.

Month.	Monthly mean.	Highest daily mean.	Lowest daily mean.	Maximum.	Minimum.	Monthly range.	Warmest day.	Coldest day.	Rain and melted snow.	Fair days.	Cloudy days.	Rainy days.	Snowy days.	Snowy and rainy days.	Prevailing wind, force, and direction.
	Deg.	*Deg.*	*Deg.*	*Deg.*	*Deg.*	*Deg.*			*Inches.*						
January	28.90	40.66	3.66	50	— 8	58	14th	30	2.84	12	10	2	6	1	Light, SW., SE.
February	32.65	46.33	19.00	53	10	43	26	16	6.70	5½	10	7½	5	.....	Light, SW., SE.
March	39.33	59.33	21.33	77	1	76	26	2	3.06	19	4½	2½	4	1	Strong, SW., NW.
April	43.87	60.66	32.66	78	21	57	25	11	4.31	14	4	8	2	2	Moderate, SW., NW.
May	54.38	71.66	36.00	86	24	62	10	1	10.54	11½	8½	10	1	.....	Light, SE., SW.
June	64.10	80.00	53.00	96	42	54	28	3	3.79	19	4	7	.....	.....	Mod., SW. to NE.
July	69.50	77.33	60.00	94	43	51	15	3	3.30	16½	7½	7	.....	.....	Light, SW., NW.
August	66.24	77.66	55.00	92	37	55	12	27	3.32	19	7½	4½	.....	.....	Light, SW. to NE.
September	64.26	80.00	46.00	96	32	64	12	27	3.80	21	3	6	.....	.....	Light, SW., NW.
October	49.59	67.00	29.66	81	25	56	10	26	5.68	11	6	11	.....	3	Light, SW., NW.
November	35.23	55.33	27.33	63	15	48	1	24	2.64	5	9	4	9	3	Light, SW., NW.
December of 1850	26.14	39.66	12.33	45	— 6	51	2	13	3.10	7	12½	2	8½	1	Light, SW., NW.
Total	.....	.....	.....	.....	.....	.....	.....	.....	53.08	160½	86½	71½	35½	11	

The yearly mean is 47°.85.
The coldest day in the year, January 30.
The warmest day in the year, June 28.
The yearly range, 104°.
Ground-sparrows appeared, February 25.
Willows in blossom, March 18.
Peach, currant, &c., April 29.
Oaks in leaf, May 17.
Wheat in full blossom, June 19.
First autumnal frost, September 25.
First snow, October 21.

Abstract of Meteorological observations made near Fort Madison, Lee county, Iowa, for the year ending Nov. 30, 1851.

By D. McCready.

Months.	Monthly mean.	Highest temperature.	Time of highest temperature.	Lowest temperature.	Time of lowest temperature.	Range.	Quantity of rain.	Quantity of snow.	Prevailing course of wind from—	Days on which snow and rain fell, and other remarks.
							Inches.	*Inches.*		
December, 1850.	25.03	46	Sunset, 1	0/2	Sunrise, 5, 8	48	2.00	2.37	NW. and SW..	Rain, 1, 2; snow, 3, 4, 5, 6, 18, 28; depth of rain in 1850, 47.39 inches; snow, 18.57; yearly mean, 50.86.
January, 1851..	30.13	58	Noon, 24, 25	0/12	Sunrise, 30	70	55	.75	SW. and NW..	Rain, 8, 27; snow, 16, 28, 31.
February, 1851.	34.25	66	Noon, 23, 24	4	Sunrise, 11, 16	62	1.70	.05	NW. and SW..	Rain, 14, 19, 26; snow, 21.
March, 1851...	43.44	76	Noon, 29	15	Sunrise, 8	61	1.66	.05	NW., SW., SE.	Rain, 4, 5, 16, 20, 21, 22, 29, 30; snow, 7.
April, 1851....	48.03	76	Noon, 25	28	Sunrise, 6, 8	48	2.45	10.00	NW., SE., SW.	Rain, 1, 4, 7, 12, 13, 18, 29; snow-storm commenced night of 4th; storm from NW., continued to drift and storm until 3 o'clock in the evening of the 5th.
May, 1851....	62.37	86	Noon, 28	26	Sunrise, 1	40	10.80	.....	SE., SW., S....	Rain, 2, 6, 7, 9, 11, 12, 16, 17, 18, 19, 20, 21, 26, 27, 28, 30, 31.
June, 1851.....	68.88	96	Noon, 26	50	Sunrise, 4	46	8.60	.....	SE., SW.....	Rain, 2, 3, 4, 5, 6, 12, 14, 15, 19, 20, 21, 25, 26, 28, 30.
July, 1851.....	77.23	102	Noon, 28	51	Sunrise, 1	51	5.95	.....	SE., SW.....	Rain, 1, 4, 6, 15, 16, 17, 22, 23, 28; cholera in Fort Madison 25th.
August, 1851...	71.91	93	Noon, 8	52	Sunrise, 27	66	2.95	.....	SE., NE., E....	Rain, 2, 3, 6, 10, 11, 13, 25, 29; cholera in West Point, second time, 11th, and Madison, second time, 8th to 12th.

September, 1851	71.34	94	Noon,	6	32	Sunrise,	28	62	1.90	.....	SE.....	Rain, 13, 18, 20, 23; first frost 25th, end of the growing season.
October, 1851..	54.32	80	Noon,	1	18	Sunrise,	26	54	2.70	.....	SE., SW., NW.	Rain, 9, 10, 28.
November, 1851	36.90	54	Noon & sunset	4	19	Sunrise,	6, 10	35	2.97	.50	NW., SW., SE.	Rain, 11, 12, 19, 27; snow, 22.
Yearly mean...	51.98	.....	.....		.....	.....		....	44.23	13.72		

The thermometer is elevated 5 feet from the ground, has a northern exposure, out of the influence of the direct rays of the sun. The mean temperature is deduced from three daily observations, taken at sunrise, noon, and sunset. The rain gauge was a vessel of equal width at top and bottom, usually set upon the ground. January 30 was the coldest day during this far of 1851; thermometer 12 degrees below zero at sunrise, 1 degree at noon below, and 3 above zero at sunset. July 28, warmest day; thermometer at 10 o'clock, A. M., 99°; at 2 o'clock, 102°; at 12 o'clock, 100°; at sunset, 83°. July 13, at 11 o'clock, thermometer 100°, and remained so until half-past 2 o'clock in the evening. N. B. $\overset{\circ}{12}$ means 12 degrees below zero.

ABSTRACTS FROM A METEOROLOGICAL JOURNAL, KEPT BY J. HALL AT ATHENS, MENARD COUNTY, ILLINOIS.—LATITUDE 39° 55′ NORTH; LONGITUDE 12° 52′ WEST FROM WASHINGTON.

Table No. 1, *showing the mean temperature of each month; also, the average clearness of the sky and quantity of rain, for the year* 1851.

Months.	TEMPERATURE.								Clearness of the sky—monthly average.	Perpendicular depth of rain which fell during the month.
	At sunrise.	At 9 a. m.	At 3 p. m.	At sunset.*	Monthly mean.	Highest degree.	Lowest degree.	Monthly range.		
January	24.93	30.45	37.12	34.06	31.64	61	— 9	70	5.71	0.52
February	29.14	34.75	42.14	38.28	36.07	63	8	55	4.03	4.38
March	35.64	46.06	53.16	48.12	45.74	76	16	60	6.31	0.05
April	40.6	51.26	57.90	51.80	50.24	76	29	47	5.67	4.70
May	55.71	66.06	73.19	66.64	65.41	92	26	66	5.61	6.71
June	62.76	70.10	75.86	69.96	69.68	87	52	35	4.76	10.16
July	68.19	78.90	84.03	76.64	76.91	96	52	44	7.60	3.45
August	65 70	73.81	79.19	70.90	72.41	92	54	38	5.35	6.86
September	62.30	72.46	79.30	68.30	70.64	93	37	56	7.13	2.79
October	46.42	56.09	62.77	51.90	54.48	79	23	56	6.92	0.98
November	33.33	38.63	43.76	36.30	38.11	58	19	39	3.73	2.38
December	21.07	25.64	30.54	24.33	25.55	62	—11	73	3.36	2.93
Yearly mean	45.47	53.68	59.91	53.10	53.07	96	—11	107	5.51	46.91

* After the 1st of August the observations were omitted at sunset and made at 9 p. m.

Table No. 2, exhibiting the mean temperature of each month from July, 1847, to January, 1852; also, the highest and lowest degree of temperature, together with the monthly range.

Months.	1847.				1848.				1849.				1850.				1851.			
	Monthly mean.	Highest degree.	Lowest degree.	Monthly range.	Monthly mean.	Highest degree.	Lowest degree.	Monthly range.	Monthly mean.	Highest degree.	Lowest degree.	Monthly range.	Monthly mean.	Highest degree.	Lowest degree.	Monthly range.	Monthly mean.	Highest degree.	Lowest degree.	Monthly range.
January	.....	.....	.....	.....	31.52	58	— 9	67	31.10	55	— 9	64	30.85	55	— 1	56	31.64	61	— 9	70
February	.....	.....	.....	.....	32.15	65	5	60	26 23	57	—11	68	30.95	55	— 5	84	36.07	63	8	55
March	.....	.....	.....	.....	38.31	78	— 7	85	42.53	78	23	55	36.19	74	5	68	45.74	76	16	60
April	.....	.....	.....	.....	48.22	84	26	58	48.22	84	22	62	44.44	74	23	51	50.24	76	29	47
May	.....	.....	.....	.....	63.70	92	38	53	63.22	86	31	55	56 51	88	30	58	65.41	92	26	66
June	.....	.....	.....	.....	67.47	92	40	52	71 48	95	52	43	71.38	91	44	47	69.68	87	52	25
July	74.64	97	45	52	69.25	92	48	44	72 63	100	48	52	76.13	96	57	39	76.91	96	52	44
August	70.87	88	47	41	70.34	91	51	43	69.28	89	43	46	71 97	96	55	41	72.41	92	54	38
September	65.60	90	42	48	57.46	88	35	53	64 36	86	42	44	63 70	87	46	41	70.64	93	37	56
October	52.71	88	20	68	50.07	77	26	51	50 46	75	25	50	52.45	79	24	55	54.48	79	23	56
November	40.93	78	12	66	32.75	59	7	52	37 53	77	25	52	40.71	72	20	52	38.11	58	19	39
December	30.38	64	— 6	70	25.58	59	0	59	28.20	54	— 1	55	25.82	42	— 4	53	25.55	62	—11	73
Annual mean.	55.85	.....	.....	.....	49.73	94	— 9	103	49.88	100	—11	111	50.37	96	— 9	105	53.07	96	—11	107

Table No. 3, containing the amount of rain which fell during each month for nine years, viz: from January 1, 1843, to January 1, 1852.

Months.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	Monthly average.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches*	*Inches.*	*Inches.*
January	2.00	2.80	1.95	4.87	2.27	1.60	5.54	1.51	0.52	2.56
February	1.92	1.30	0.46	1.83	3.47	2.37	1.04	0.80	4.38	1.95
March	3.05	3.40	2.20	2.55	1.51	4.47	4.71	1.52	1.05	2.71
April	4.50	5.90	6.50	7.84	2.09	3.33	4.96	5.03	4.70	4.98
May	6.00	7.55	2.55	3.96	3.12	4.03	3.51	3.60	6.71	4.55
June	5.74	17.13	13.63	5.28	1.07	4.48	2.91	6.22	10.16	7.40
July	1.87	4.50	2.62	2.33	2.01	4.55	2.31	4.50	3.45	3.12
August	0.75	2.80	1.63	1.13	2.64	5.03	3.43	6.40	6.86	3.40
September	6.60	0.32	4.14	7.44	3.76	1.70	5.66	4.68	2.79	4.05
October	1.00	1.00	2.48	1.16	4.62	2.23	2.46	2.06	0.98	1.99
November	5.10	1.75	3.35	1.55	4.80	2.05	1.37	2.58	2.38	2.77
December	2.40	0.72	1.48	4.96	1.25	8.39	1.19	1.79	2.93	2.79
Annual amount	40.93	49.17	43.01	44.90	32.61	44.23	38.49	40.69	46.91	42.33

ATHENS, MENARD COUNTY, ILLINOIS,
January 1, 1852.

DEAR SIR: The foregoing abstracts from my meteorological journal, which I now send for publication in the "Patent Office Report," are copied with great care. My observations being made for my own use, I think that I can say that they can be relied upon as being as correct as observations could be made under ordinary circumstances.

J. HALL.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS NEAR WASHINGTON, ARKANSAS, FOR THE YEARS 1850 AND 1851, NORTH LATITUDE 33° 44′.

By N. D. Smith.

Months.	1850.			1851.		
	Thermometer.		Rain.	Thermometer.		Rain.
	Highest.	Lowest.	Inches.	Highes.	Lowest.	Inches.
January - - -	66	28	10.75	70	18	1.12
February - - -	78	14	5.12	76	20	12.25
March - - - -	80	28	3.25	80	28	4.5
April - - - -	86	36	9.5	84	38	2.25
May - - - -	90	44	3.87	88	38	3.75
June - - - -	92	56	3.88	94	64	2.38
July - - - -	94	64	4.38	100	62	1.75
August - - -	101	63	7	102	64	2.5
September - - -	88	52	1	94	44	.62
October - - -	82	32	4.62	86	36	1.25
November - - -	78	22	4.87	80	18	3.25
December (to the 10th) -	74	12	5	74	18	.5
			63.24			36.12

Warmest day in 1850, August 13, 101°. Coldest day in 1850, December 7, 12°. Warmest day in 1851, August 14, 102°. Coldest day in 1851, January 9, 18°.

The above report, as to rain, will only apply to my own immediate neighborhood, and would vary materially from an account kept within three miles of me, in any direction. To ascertain the quantities of rain that fall in any considerable extent of country, during any given time, it would be necessary to keep accounts at different places. In this southern clime, especially during the summer months, we seldom have a general rain, but only local showers, pervading but a small extent of territory; and not unusually these local showers fall repeatedly upon the same localities, sufficiently often for the requirements of the growing crops, making them abundant; while within the distance of two or three miles very distinct showers, and at very different times, are received, and in insufficient quantities. These showers also vary in their quantities and manner of falling; sometimes we have a fall of two and even three inches in the space of an hour, and succeeded by a drought of four or five weeks; and again we have light showers of an eighth or a quarter of an inch a day, for several days in succession.

In 1850, from the 20th February to the 1st of April, the weather was favorable, and the soil in good condition for ploughing and planting, and much corn was up, promising well; but on the first two days of this month, there fell nearly three inches of rain, which saturated the ground;

this was followed by frost, that killed most of the corn that was up. Replanting was immediately resorted to; but from the 16th of April to the 13th of May a continued succession of cold rains, amounting to nine inches in all, had the effect of rotting the seed in the ground, making replanting again necessary. From this time the season continued favorable until the last of July, when a drought commenced which continued till the 25th of August. Corn was in roasting ear, and cotton backward. Rain then set in, and in six days there fell seven inches, accompanied with a wind that prostrated all the heavy corn and destroyed a large portion of it. Corn and cotton that year yielded less than half the average.

In 1851, from the middle of March to the middle of May, the season was as favorable as could be desired, and every prospect of fruitfulness better than we had had for several years; but from that time, when an increased supply of rain was essential to perfect the crops, a drought followed, with highly increased heat, the thermometer ranging up to 90°, and gradually rising, through July and August, up to 102°, without rain enough at any one time to lay the dust. Our wells throughout the prairies all failed, and all the streams nearly dried up. Many families were compelled to haul water for house use from two to five miles. Cotton suffered much less than corn, and is said to be two-thirds of an average crop. Corn is less than half, and sweet potatoes almost a failure. And yet, in a neighborhood only two miles from me, a rain of two inches fell on the 17th of June, and another of one inch on the 10th of July—those five plantations have produced first rate crops. Many instances of the kind have occurred in small districts throughout the country.

METEOROLOGICAL OBSERVATIONS MADE AT EAST MONTPELIER, WASHINGTON COUNTY, VERMONT.

By B. J. Wheeler.

1844.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenings.	Cloudy evenings.	Rainy even's.	Snowy evenings.
January - -	18	8	1	4	19	4	3	5
February - -	13	14	-	2	11	16	-	2
March - -	16	12	1	2	11	16	2	2
April - -	20	9	1	-	20	8	2	
May -	9	22	-	-	11	17	3	
June - -	12	14	4	-	11	15	4	
July - -	19	9	3	-	15	11	5	
August - -	15	16	-	-	12	17	2	
September -	22	7	1	-	17	11	1	1
October - -	14	13	4	-	10	15	6	
November -	10	18	-	2	10	17	1	2
December -	9	22	-	-	9	21	1	
Total - -	177	164	15	10	156	168	30	12

1845.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenings.	Cloudy evenings.	Rainy evenin's.	Snowy even's.
January - -	8	20	-	3	11	17	1	2
February - -	12	13	1	2	13	11	1	3
March - -	15	14	-	2	15	15	-	1
April - -	13	15	1	1	14	14	1	1
May - - -	15	16	-	-	16	12	2	1
June - -	20	10	-	-	18	10	2	
July - -	17	13	1	-	17	12	2	
August - -	21	9	1	-	21	10		
September -	14	14	2	-	12	17	1	
October - -	21	8	2	-	18	12	1	
November -	5	21	4	-	9	18	2	1
December -	15	12	-	4	13	14	-	4
Total - -	176	165	12	12	177	162	13	13

Meteorological Observations at East Montpelier—Continued.

1846.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenin's.	Cloudy evenin's.	Rainy evenin's.	Snowy even's.
January - -	9	19	1	2	11	18	1	1
February - -	12	13	-	3	11	15	-	2
March - -	15	15	1	-	14	16	1	
April - -	19	11	-	-	18	9	3	
May - - -	11	20	-	-	15	13	3	
June - -	14	15	1	-	16	8	6	
July - - -	12	19	-	-	16	13	2	
August - -	19	12	-	-	20	11		
September -	19	10	1	-	18	10	2	
October - -	9	20	1	1	12	17	2	
November -	7	21	-	2	8	19	1	2
December -	8	21	-	2	11	16	-	4
Total - -	154	196	5	10	170	165	21	9

SNOW.

	Inches.
January - - - - - -	27
February - - - - - -	18
March - - - - - -	4
April - - - - - - -	2
May - - - - - - -	1
October - - - - - -	10
November - - - - - -	20
December - - - - - -	26
Total - - - - - -	9 feet.

Meteorological Observations at East Montpelier—Continued.

1847.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenin's.	Cloudy evenin's.	Rainy evenin's.	Snowy even's.
January - -	10	20	-	1	10	17	1	3
February - -	9	18	-	1	8	17	1	2
March - -	15	15	-	1	14	15	1	1
April - -	10	19	-	1	14	15	1	
May - - -	17	11	3	-	19	10	2	
June - -	12	18	-	-	9	19	2	
July - -	16	15	-	-	14	15	2	
August - -	18	13	-	-	14	16	1	
September -	11	19	-	-	12	17	1	
October - -	13	17	1	-	15	13	3	
November -	8	21	1	-	10	16	4	
December -	5	24	1	1	5	22	3	1
Total - -	144	210	6	5	144	192	22	7

SNOW.

	Inches.
January - - - - - -	31
February - - - - - -	28
March - - - - - -	22
April - - - - - -	13
May - - - - - - -	1
November - - - - - -	5
December - - - - - -	17
Total - - - - - -	9 ft. 9 in.

Meteorological Observations at East Montpelier—Continued.

1848.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenin's.	Cloudy evenin's.	Rainy evenin's.	Snowy even's.
January - -	14	16	-	1	16	14	-	1
February - -	14	14	-	1	14	14	-	1
March - -	11	18	-	2	15	15	-	1
April - -	15	15	-	-	23	4	2	1
May - - -	12	18	1	-	10	20	1	
June - -	6	23	1	-	12	16	2	
July - - -	8	21	2	-	12	16	3	
August - -	17	14	-	-	20	8	3	
September -	9	21	-	-	10	17	3	
October - -	9	20	2	-	11	15	5	
November -	6	23	1	-	7	21	1	1
December -	3	23	3	2	7	22	-	2
Total - -	124	226	10	6	157	182	20	7

SNOW.

	Inches.
January - - - - - -	26
February - - - - - -	29
March - - - - - -	27
April - - - - - - -	4
November - - - - - -	7
December - - - - - -	29
Total - - - - -	10 ft. 2 in.

Meteorological Observations at East Montpelier—Continued.

1849.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenin's.	Cloudy evenin's.	Rainy evenin's.	Snowy even's.
January - -	13	17	-	1	10	19	1	1
February - -	7	19	-	2	14	13	-	1
March - -	8	21	-	2	12	17	1	1
April - -	11	18	-	1	11	16	1	2
May - -	6	25	-	-	8	21	2	
June - -	16	14	-	-	17	12	1	
July - -	17	14	-	-	18	12	1	
August - -	14	15	2	-	20	7	4	
September -	13	17	-	-	17	12	1	
October - -	9	20	2	-	10	18	3	
November -	6	23	1	-	9	16	4	1
December -	4	22	-	5	5	19	-	7
Total - -	124	225	5	11	151	182	19	13

SNOW.

	Inches.
January - - - - - -	10
February - - - - - -	16
March - - - - - -	20
April - - - - - -	6
October - - - - - -	1
November - - - - - -	1
December - - - - - -	23
Total - - - - - -	6 ft. 5 in.

Meteorological Observations at East Montpelier—Continued.

1850.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy d ys.	Clear evenin's.	Cloudy evenin's.	Rainy evenin's.	Snowy even's.
January - -	10	19	-	2	10	18	-	3
February - -	12	16	-	-	7	19	1	1
March - -	14	15	-	2	13	16	-	2
April - -	20	6	3	1	16	12	-	2
May - -	6	21	4	-	12	13	6	
June - -	14	15	1	-	12	16	2	
July - - -	12	17	2	-	16	12	3	
August - -	12	18	1	-	20	9	2	
September -	12	18	-	-	16	11	3	
October - -	11	18	2	-	14	10	6	1
November -	9	18	2	1	11	18	1	
December -	6	20	-	5	9	13	1	8
Total - -	138	201	15	11	156	167	25	17

SNOW.

	Inches.
January - - - - - -	25
February - - - - - -	20
March - - - - - -	12
April - - - - - - -	15
October - - - - - -	1
November - - - - - -	6
December - - - - - -	50
Total - - - - - -	10 ft. 9 in.

Meteorological Observations at East Montpelier—Continued.

1851.

Months.	Clear days.	Cloudy days.	Rainy days.	Snowy days.	Clear evenin's.	Cloudy evenin's.	Rainy evenin's.	Snowy even's.
January - -	6	21	-	4	8	20	-	3
February - -	8	16	3	1	11	12	5	
March - -	8	21	-	2	13	17	-	1
April - -	9	20	1	-	12	15	3	
May - -	7	22	2	-	8	17	6	
June - -	13	17	-	-	14	13	3	
July - -	13	17	1	-	12	18	1	
August - -	12	18	1	-	17	11	3	
September -	16	12	2	-	19	9	2	
October - -	9	19	3	-	13	14	3	1
November -	5	21	2	2	6	20	2	2
December -	9	17	3	2	10	15	1	5
Total - -	115	221	18	11	143	181	29	12

SNOW.

	Inches.
January - - - - - -	19
February - - - - - -	8
March - - - - - -	13
April - - - - - -	3
October - - - - - -	1
November - - - - - -	30
December - - - - - -	19
Total - - - - - -	7 ft. 9 in

Mean temperature of each month, and of the year, deduced from observations made at sunrise, noon, and sunset of each day.

Months.	Sunrise.	Noon.	Sunset.	Mean.
January	15.2	25.5	22.2	21
February	17.4	29	26.3	24.2
March	24.1	39.4	33.8	32.4
April	33	47.9	43	41.3
May	43.3	59.4	50 9	51.2
June	47.4	67.7	57·3	57.5
July	54.6	73	62.8	63 4
August	50.7	71	61	60 9
September	47.2	65.2	58.5	57
October	40.1	54.6	50.5	48.4
November	25.1	35 2	30.8	30.3
December	11.7	22.6	19.4	17.9
Mean	34.1	49.2	43	42.1

Range at sunrise, 93.
Range at noon, 92.
Range at sunset, 83.
Range during the year, 109.
Warmest sunrise, September 13, 68.
Warmest noons, June 30 and September 10, 84.
Warmest sunsets, June 29 and September 10, 76.
Warmest day, June 30; mean temperature, $73\frac{2}{3}$.
Coldest sunrise, February 1, 25.
Coldest noon, January 30. 8.
Coldest sunset, January 30, 7.
Coldest day, January 30; mean temperature, $8\frac{2}{3}$.

METEOROLOGICAL OBSERVATIONS MADE AT LITCHFIELD, CONNECTICUT, FOR THE YEAR 1851.

By J. L. Hendrick.

Months.	Thermometer.				Weather.						Winds.									Remarks.
	Mean temperature.	Highest degree.	Lowest degree.	Range.	Fair.	Cloudy.	Rain.*	Snow.†	Rain and snow.	Foggy.	East.	Southeast.	South.	Southwest.	West.	Northwest.	North.	Northeast.	Prevailing wind.	
January.....	25.29	50	9	59	19.5	11.5	3	5	1	....	5	3	5	17	20	18	5	4	W. and NW..	Month rather mild.
February....	28.27	50	4	54	10.5	17.5	10	2	....	8	8	2	6	14	10	15	8	5	SW and NW.	First half month cold; second half month mild.
March	33.60	66	12	54	16.5	14.5	1	9	1	....	6	2	4	16	9	14	7	6	SW. and NW.	Month rather mild.
April.....	42.14	68	20	48	14.5	15.5	9	2	....	1	6	6	5	8	4	10	10	10	NE. and NW.	Whole month rather cold.
May.....	52 52	83	25	58	16.5	14.5	10	....	2	3	5	4	7	18	12	10	3	5	SW.....	Whole month rather cold.
June.....	60.31	92	39	53	21	9	7	....	....	6	7	3	4	18	16	10	3	3	SW.....	Cold till 20th; then warm.
July.....	66.33	88	49	39	17	14	16	....	....	5	6	2	4	13	17	19	6	2	W.....	Month rather cold—at least nights.
August.....	63.87	87	40	47	21	10	9	....	....	4	5	2	5	19	7	10	3	4	SW.....	Month rather cold—at least nights.
September....	59.45	90	29	61	20	10	9	....	....	3	8	2	4	12	9	8	6	6	SW.....	Warm 6th to 13th, inclusive; warmest week of season.
October.....	50.16	74	28	46	18	13	9	1	....	3	2	4	6	13	15	8	9	4	SW. and W.	Month mild.
November....	32.53	55	13	42	14	16	5	6	....	1	4	2	1	3	15	15	8	1	W. and NW..	Month variable; generally cold.
December...	19.99	50	9	59	16	16	2	6	....	4	8	1	2	9	13	11	7	2	W.....	First half month mild; second half month very cold.
Whole year..	44.54	92	9	101	204.5	160.5	90	31	4	38	70	33	53	160	147	139	75	52	SW.....	Summer rather cold.

* I have no rain-gauge.

† Last fall of snow in spring, May 5 and 6. Last frost 7th. First frost in autumn, September 15. (light;) 25th, severe. First fall of snow in autumn, October 26, two inches deep. Three frosts in September; six frosts in October. November 24, severe snow-storm. Fine sleighing two or three days.

Winds.—The table of winds on the preceding page does not show he number of days that the wind blew from the several points of the compass, but the number of *times* that the vane was observed to point in the several directions, whether it remained in that direction a few minutes or a whole day. The object has been to show the *variation* of the wind as well as the *prevailing wind.*

Range of the Thermometer.—The greatest range of the thermometer, as shown by the foregoing table, is that of September, (61°,) and the next greatest those of January and December, (59°.) Warmest month in the year, July; warmest week, September 6 to 13; warmest day, June 27; coldest, December 26; mean, from sunrise to sunset, $2\frac{1}{3}$°.

The mean temperature is not estimated in degrees and minutes, but in degrees and decimals.

The thermometer is kept on the north side of a building, beyond the reach of reflected heat, and fully exposed to the air. Difference in the temperature of this place and that of the south side of the building, on the 27th day of December, 11 to 12 o'clock a. m., 34°.

A Garden Experiment.—The piece of ground that I now occupy as a garden was originally an alder swamp, though situated on a hill of considerable extent and elevation. When cleared, it was partially drained, and used for a number of years as a garden, but was finally abandoned as too wet. In the autumn of 1849, it was ploughed and drained, having lain to meadow a number of years, and was found to consist of a dark clay muck, or loam, so deep that the plough did not reach the bottom, or subsoil, which is a sandy, gravelly loam, with a small mixture of clay.

Among the things planted in the spring of 1850, was a bed of marrowfat peas. The vines, or straw, grew very large, but the pods were small, and not well filled. In the spring of 1851, it was ploughed again, and a ditch dug along one side so deep as to throw up enough of the subsoil to cover a strip three or four feet wide to the depth of two or three inches. On this strip I planted peas again; and not only were the vines large, but the pods, also, were numerous, large, and well filled. I ascribe the difference of the result only to the mixture of the subsoil.

Potatoes.—The potato malady appears to have prevailed more extensively during the past season (1851) than it did the previous year, yet the crop in general is thought to be better than that of 1850.

Best varieties: "Waterbury reds," or "sand-lakes," "mercers," and "pink-eyes."

Time of planting: If on a moist, rich soil, they should be planted early, and dug and used early, or the crop will be lost. Early planting is considered best on any soil.

Progress of the Year.—In my remarks of last year, I stated the probability of being able to give something more definite the present year. I have, however, little to communicate. There is, perhaps, a slow and gradual improvement in the agricultural department of society. I infer this from the condition of our late agricultural fair, compared with those of former years. The interest taken in the matter appeared to be greater than formerly. Many of the agricultural products appeared to be better

than those of former years; the character of the stock showed an advance, and farmers seemed more inclined to read on subjects pertaining to their profession. The public mind seems to be waking up a little; and, all things considered, there is hope of a change for the better.

Respectfully, yours,

J. L. HENDRICK.

Hon. THOMAS EWBANK,
Commissioner of Patents.
LITCHFIELD, *January* 1, 1852.

Meterological Record for the year 1851 *at Beaver Brook, Sullivan county, N. Y.* By CHAS. S. WOODWARD.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
Jan.	1	28.93	28.88	28.89	18	28	28	West.....	Northwest...	WNW ...	Clear, cloudy and squally.
	2	29.13	29.14	29.00	25	31	32	NNW.....	South.....	Southeast...	Clear, with light winds.
	3	28.69	28.69	28.70	27	31	29	NNW.....	Northwest...	Southeast...	Cloudy and blustry.
	4	28.63	28.62	28.79	28	29	26	Southeast...	NN\.....	.....	Snow, with high wind.
	5	29.08	29.10	29.06	18	24	27	Northwest...	West.....	Southeast...	Snow at night.
	6	29	29	28.99	27	34	3[illegible]	North.....	South.....	Southwest..	Clear, cloudy, and pleasant.
	7	28.94	28.97	29.15	33	37	2[illegible]	Calm	Northwest..	Northwest..	Cloudy ; clear.
	8	29.27	29.30	29.30	24	25	33	Northwest..	North.....	East.....	Clear and pleasant.
	9	29.09	29.02	28.79	31	31	38	East.....	Southeast...	Southeast...	Cloudy and light rain.
	10	28.70	28.78	28.76	38	43	43	West.....	West.....	Southwest..	Cloudy.
	11	28.88	28.91	28.92	35	38	37	Northwest..	Northwest ..	Southwest..	Cloudy.
	12	28.87	28.85	28.88	31	35	37	SW ; SE...	SW.; S....	Southwest..	Cloudy.
	13	28.98	29	29.02	34	38	38	Northwest..	West	West.....	Fair.
	14	29.12	29	28.97	33	38	42	Northwest...	Southwest...	Southwest..	Cloudy.
	15	28.87	28.84	28.82	37	42	49	NW.; SE..	South.....	South.....	Cloudy.
	16	28.92	28.87	28.86	42	45	50	West.....	West.....	South.....	Cloudy.
	17	28.79	28.92	29.18	50	44	39	Southwest..	Northwest...	West.....	Cloudy and blustry.
	18	29.26	29.31	29.44	29	34	26	West.....	Northwest...	Northwest...	Clear.
	19	29.60	29.63	29.55	17	22	29	North.....	Southeast...	Southeast...	Clear and calm.
	20	29.[illegible]7	29	29.02	28	34	36	East.....	Southwest..	SW.; NW..	Cloudy, with snow and rain.
	21	29.27	29.35	29.35	31	36	36	North.....	North.....	West.....	Cloudy ; clear.
	22	29.16	29.05	28.98	32	34	35	East.....	West.....	Southwest..	Snow.
	23	29.08	29.18	29.22	34	40	41	SW.; NW.	Southwest..	North; west.	Pleasant ; northern lights at night.
	24	29.22	29.13	29.10	29	43	45	S.; N.....	Southw st..	Southwest..	Clear.
	25	29.30	29.30	29.17	36	39	44	West.....	Southwest..	Southwest..	Pleasant.
	26	29	29	28.98	35	44	47	Northwest...	Southwest..	Nordwest..	Pleasant.
	27	29.06	29.10	29.20	33	40	34	Northwest...	West.....	West.....	Pleasant.
	28	29.15	29	28.84	30	31	33	Southeast ..	Southeast...	Northeast .	Snow, hail, and rain.
	29	28.27	28.27	28.44	37	35	24	NE.; NW..	Northwest..	Nordwest...	Snow squalls and high winds.
	30	28.27	28.83	29.05	11	11	10	Northwest...	Northwest..	Northwest..	Blustry and cold.
	31	28.72	29.44	29.60	19	14	20	Northwest...	Northwest..	Northwest...	Blustry and cold.
		29.30									

Barometer average, 29.02; highest, January 19; lowest, January 29. Thermometer—average, 32 86; highest, January 16 and 17; lowest, January 31.

Meteorological Record for the year 1851—Continued.

	Barometer.			Thermometer.			Wind.			Remarks.
	Morn.	Noon.	Night.	Morn.	Noon.	Night	Morn.	Noon.	Night.	
Feb. 1	29.72	29.70	29.66	14	20	25	North.....	Southeast...	South.....	Cloudy; snow at night.
2	29.45	29.43	29.37	25	29	32	Southeast...	West.....	West.....	Cloudy.
3	29.23	29.22	29.17	31	35	42	Northwest...	Northwest...	Southwest..	Fair.
4	28.94	28.84	28.74	27	34	37	Southwest..	Southwest..	Southwest..	Heavy white frost; fair.
5	28.70	28.70	28.70	35	37	37	Northwest...	Southwest..	Southwest..	Cloudy and windy.
6	28.66	28.80	29.08	35	29	26	Northwest...	Northwest...	Northwest...	Blustry.
7	29.12	29.13	29.02	20	24	27	Northwest...	Northwest...	Northwest..	Cloudy; flying snow.
8	29.27	29.32	29.33	19	20	21	North.....	West.....	East.....	Cloudy.
9	29.20	29.12	29.08	19	23	26	Southwest..	South.....	Southwest..	Snow at night; cloudy.
10	29	28.88	28.77	31	36	42	Southeast...	South.....	Southeast...	Rain; foggy; rain all night.
11	28.87	29	29.18	45	41	36	Northwest...	Northwest..	Northwest...	Cloudy; blustry.
12	29.53	29.63	29.70	25	29	34	Northwest..	Northwest...	North.....	Fair.
13	29.76	29.76	29.67	23	30	37	South.....	Southwest..	SW.; SE...	Fair.
14	29.52	29.44	29.33	36	39	42	South.....	South.....	South.. ...	Rain and mist.
15	28.92	28.84	28.76	47	51	57	South.....	South.....	S; SW.....	Rain; cloudy.
16	29	29.07	29 23	37	37	34	SW.; NW.	Northwest...	Northwest...	Blustry.
17	29.50	29.55	29.55	27	31	40	Northwest...	Northwest...	South; west.	Fair.
18	29.40	29.41	29.58	32	36	42	West; south	Northwest...	West.....	Fair; northern lights.
19	29.72	29.74	29.68	29	35	43	Northwest...	Southeast...	Southeast...	White frost; fair.
20	29.47	29.36	29.33	37	41	42	South.....	Southeast...	Southwest..	Hail and rain.
21	29.18	29.13	29	45	47	49	Southeast...	Southeast...	Northeast ..	Rain continues; rainy night.
22	28.95	29	29.07	44	46	47	SW.; NE..	West.....	Northwest...	Squally.
23	29.15	29.18	29.16	43	47	54	Northwest...	Southwest..	Southwest..	Fair.
24	28.99	28.80	28.69	47	48	46	South.....	East.....	Northwest...	Rainy day.
25	29.03	29.10	29.21	37	37	45	Northwest...	Northwest...	Northwest ..	Windy; fair.
26	29.31	29.30	29.28	34	43	44	NW.; S....	Southwest..	South.....	Clear.
27	29.20	29.17	29.05	42	47	47	South.....	Southeast...	Southeast...	Cloudy; rain at night.
28	28.79	28.76	28.83	47	44	40	NE.; NW..	Northwest...	Northwest...	Cloudy and windy.

Barometer.—average, 29.19; highest, February 13; lowest, February 6. Thermometer—average, 36.3; highest, February 15; lowest, February 1.

Meteorological Record for the year 1851—Continued.

	Barometer.			Thermometer.			Wind.			Remarks.
	Morn.	Noon.	Night.	Morn.	Noon.	Night	Morn.	Noon.	Night.	
March 1	29.02	29.07	29.03	32	40	45	Northwest...	West	West	Clear.
2	29	28.97	28.89	39	43	48	SW.; S....	SW.; SE...	South.....	Fair.
3	28.90	29.01	29.11	37	34	33	Northwest...	Northwest...	West	Snow squalls and high winds.
4	29.17	29.10	29.07	30	40	47	Southeast...	Southwest..	Southeast...	Fair.
5	28.99	29.07	29.03	45	50	55	West	Southeast...	Southeast...	Fair; cloudy.
6	28.93	28.95	29 12	49	51	43	South	Northwest...	Northwest..	Cloudy; shower; cloudy and windy.
7	29.30	29.31	29.21	38	38	42	North.....	South.....	East.....	Cloudy.
8	28.99	28.95	28.91	38	41	42	Northeast ..	East.....	East.	Snow; snow and rain.
9	29.01	29.07	29.08	34	38	47	Northwest...	Northwest...	North.....	Snow squalls; fair.
10	28.97	29.05	29.18	37	40	39	Northwest...	Northwest...	Northwest...	Snow squalls; fair.
11	29.14	28.93	28.95	30	40	46	Southeast...	West	West	White frost; cloudy.]
12	29.15	29.23	29.24	39	37	42	Northwest..	Southwest..	Southwest..	Windy; pleasant.
13	29.18	29	29.09	36	40	44	Southeast...	Northwest...	Northwest...	Snow; clear.
14	29.20	29.27	29.25	37	41	45	North.....	Southeast...	Southwest..	Fair; cloudy.
15	29.14	29	29	42	47	50	Northwest...	West	West	Foggy; rain; fair.
16	28.90	28.90	28.93	48	48	46	Northeast ..	East.....	East.....	Rain all day.
17	28.88	28.78	28.75	40	40	40	East	East.....	Northeast ..	Stormy.
18	28.70	28.70	28.70	37	38	38	North.....	North... ...	North	Snow.
19	28.70	28.70	28.69	36	40	36	Northwest...	Northwest...	Northwest...	Cloudy, and snow squalls.
20	28.69	28.70	28.78	34	34	36	Northwest...	Northwest..	West	Cloudy, and snow squalls.
21	28.87	28.92	28.98	35	40	39	Northwest...	Northwest...	Northwest...	Cloudy.
22	29.04	29.05	29.03	35	40	53	North	Calm	Southwest..	A beautiful day.
23	29.07	29.06	28.98	40	45	49	North	Southeast...	East.....	Cloudy, and looks like a storm; snow at night.
24	28.76	28.74	28.72	43	47	51	Northwest..	Southwest..	Northwest...	Fair.
25	28.93	29.10	29.26	41	44	48	Northwest...	Northwest...	Northwest...	Fair and pleasant.
26	29.40	29.38	29.32	32	42	53	Calm	Southwest..	South.....	Fair and pleasant.
27	29.23	29.18	29.09	47	64	65	South.....	Southwest..	Southwest..	Fair, pleasant, and cloudy.
28	28.96	29.07	29.30	61	58	57	SW.; W...	Northwest...	North.....	Windy.
29	29.40	29.40	29.42	38	48	53	North.....	South.....	Southeast...	White frost; pleasant.
30	29.39	29.35	29.28	42	50	55	South.....	South.....	South.....	Windy, but pleasant.
31	29.18	29.18	29.23	55	65	67	Southwest..	Southwest..	Northwest...	A beautiful day.

Barometer—average, 29.04; highest, March 29; lowest, March 19 and 20. Thermometer—average, 43.4; highest, March 31; lowest, March 4 and 11.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
April	1	29.36	29.40	29.30	45	50	60	North.....	Southeast...	Southeast...	Clear and pleasant.
	2	29.30	29.13	28.99	50	50	52	Southeast...	Southeast...	Southeast...	Rainy day.
	3	28.89	28.87	28.87	47	50	52	Northwest...	West.....	West.....	Fair.
	4	29	29.02	29.05	44	50	57	Southwest..	Northwest...	Southwest..	Fair; cloudy.
	5	29.09	29.07	29	48	58	60	North.....	South.....	Southeast...	Pleasant; cloudy; rainy night.
	6	28.80	28.82	28.93	58	64	66	South.....	Southwest..	West.....	Cloudy; clear.
	7	29.15	29.22	29.22	46	50	60	Northwest...	Northwest...	Southwest..	Cloudy and cool; pleasant; cloudy.
	8	29.14	28.80	28.71	53	55	61	South.....	Southeast...	SE.; SW...	Cloudy; heavy rain.
	9	29.13	29.26	29.32	44	47	58	Northwest...	Northwest...	Calm.....	Clear and windy.
	10	29.30	29.28	29.34	46	60	58	South.....	Southwest..	West.....	Clear and calm.
	11	29.40	29.41	29.43	41	50	48	Southwest..	West.....	Northwest...	Cloudy, clear, and cool.
	12	29.52	29.51	29.45	38	50	49	North.....	North.....	Southeast...	Pleasant.
	13	29.37	29.20	29.07	42	45	51	Northeast..	Southeast...	Southeast...	Cloudy.
	14	28.87	28.75	28.73	37	44	48	Northeast..	North.....	Southeast...	Cloudy.
	15	28.79	28.79	28.78	39	40	43	Northeast..	Northeast..	Northeast..	Cloudy; rain.
	16	28.72	28.70	28.63	43	45	46	Northeast..	North.....	North.....	Rain.
	17	28.64	28.66	28 70	43	47	48	Northeast..	North.....	North.....	Rain.
	18	28.74	28.74	28.74	43	48	48	North.....	North.....	North.....	Cloudy.
	19	28.66	28.64	28.57	43	44	43	South.....	Southeast...	Northeast..	Rain and mist; rain and snow.
	20	28.52	28.60	28.62	40	45	43	North.....	Northwest...	North.....	Snow.
	21	28.66	28.65	28.70	40	42	42	Northwest..	Northwest...	Northwest...	Rain; cloudy.
	22	28.73	28.77	28 70	38	43	50	Northwest...	Northwest...	Northwest...	Cloudy.
	23	28.85	28.90	28.90	42	50	64	Northwest...	Northwest...	Northwest.	
	24	28.80	28.75	28.75	47	58	64	Northwest...	Northwest...	Northwest.	
	25	28.80	28.80	28.90	48	52	60	East.			
	26	28.95	28.95	28.95	43	48	60	Southeast.			
	27	28.95	28.90	28.90	50	54	56	Southeast...	.....	.....	Rain; cloudy.
	28	28.90	28.92	29.04	48	50	49	Northwest...	North.....	Northwest...	Cloudy.
	29	29.10	29.16	29.17	45	48	51	Northwest...	North.....	Southwest..	Cloudy; partly clear.
	30	29.14	29.09	29.02	44	47	47	Northeast..	South.....	Southeast...	Rain all day.

Barometer—average, 28.96; highest, April 12; lowest April 20. Thermometer—average, 4[illegible]; highest, April 6; lowest, April 14.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn	Noon.	Night.	Morn.	Noon.	Night.	
May	1	28.82	28.80	28.84	47	54	47	North.....	West	Northwest...	Fair; squalls; northern lights.
	2	28.87	29	29.10	37	42	46	Northwest...	Northwest...	West	Cloudy and cold; fair.
	3	29.15	29.10	29.07	35	47	47	Southwest..	Southwest..	South.....	Frost; rain; cloudy.
	4	28.98	28.98	28.94	49	52	51	West	Northwest...	North.....	Cloudy; rain at night.
	5	28.86	28.84	28.83	44	45	43	Northwest..	North.....	North.....	Snow; rain and snow.
	6	28.90	28.94	29.05	40	46	46	North	North.....	West	Fair; cloudy.
	7	29.06	29.08	29.07	41	47	49	Southwest..	East.....	Northwest...	Fair; cloudy.
	8	29.10	29.10	29.05	42	50	60	Southwest..	.....	.. ..	Hazy, but pleasant.
	9	29.05	29.03	29.05	48	57	59	Southwest..	Southwest..	Southwest..	Hazy, but pleasant; showers.
	10	29.10	29.14	29.17	51	60	62	West	Southwest..	Southwest..	Fair; showers.
	11	29.12	29.10	29.13	56	62	67	Southwest..	Southeast ..	East; west..	Cloudy; showers; thunder showers.
	12	29.10	29.07	29.08	60	62	64	East.....	Southeast...	South.....	Foggy; light showers.
	13	29.05	29	28.94	62	70	75	Southeast ..	Southwest..	West	Foggy; thunder showers; heavy thunder showers at night.
	14	28.99	29	29.13	64	66	69	Northwest..	Northwest...	Northwest...	Cloudy, clear, and cool.
	15	29.27	29.29	29.28	50	53	65	Northwest...	Northwest...	Northwest...	Clear.
	16	29.29	29.20	29.20	52	66	64	Northeast ..	Southeast...	South... ..	Clear; hazy.
	17	29.02	28.98	29	57	61	66	Southwest..	Southwest..	Northwest...	Cloudy; showers; clear.
	18	29.03	29.08	29.12	60	63	66	North.....	Northwest...	NW.; SE..	Cloudy.
	19	29.21	29.21	29.16	60	62	62	East.....	Southeast...	Southeast...	Foggy; cloudy.
	20	29	28.92	28.86	58	71	70	East	Southwest..	Southwest..	Rain; thunder clouds.
	21	28.94	29.01	29.08	62	64	63	Northwest...	Northwest ..	Northwest...	Fair.
	22	29.09	28.94	28.84	53	62	70	West	South.....	Southwest..	Cloudy; thunder showers; heavy thunder showers at night.
	23	28.72	28.78	29.04	65	72	57	Southwest..	West	Northwest...	Hazy; showers; cool.
	24	29.35	29.39	29.40	50	57	64	North.....	West	South.....	Fair.
	25	29.43	29.41	29.41	59	61	66	Southwest..	Southeast ..	East.....	Fair.
	26	29.40	29.33	29.27	53	67	68	East.....	South	West	Foggy; fair.
	27	29.24	29.15	29.09	60	68	67	Northeast ..	Southwest..	South; west	Cloudy; showers; cloudy.
	28	29.02	29	29	66	70	78	Northwest..	.....	.....	Cloudy.
	29	29.10	29.10	29.10	66	67	66	East.....	.....	.....	Cloudy, and rain in afternoon.
	30	29.10	29.10	29.10	58	58	70	East.....	.....	.....	Cloudy and rainy.
	31	29.20	29.25	29.25	51	55	64	Northwest ..	.....	.....	Clear and pleasant.

Barometer—average, 29.08; highest, May 25; lowest, May 1. Thermometer—average, 57.8; highest, May 28; lowest, May 3.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
June	1	29.20	29.15	29.08	56	57	56	Southeast...	Southeast...	Southwest..	Cloudy; rain; cloudy.
	2	28.91	28.85	28.80	55	62	70	SW.; SE...	.....	.....	Cloudy.
	3	28.90	28.90	28.90	52	56	60	Northwest...	.....	.....	Windy.
	4	28.90	28.90	29	54	58	66	Northwest...	.....	.....	Clear and pleasant.
	5	29.10	29.15	29.14	54	58	64	Southwest..	.....	West.....	Hazy.
	6	29.05	28.99	28.86	54	60	67	Southwest..	Southwest..	South.....	Fair; showers; cloudy.
	7	28.65	28.64	28.80	66	67	64	South.....	Northwest...	Northeast ..	Rain; cloudy; stormy.
	8	28.86	28.86	28.77	58	57	55	Southeast...	Southeast...	Southeast...	Stormy all day.
	9	28.72	28.80	28.93	55	66	64	East	West.....	West.....	Stormy; showery squalls.
	10	29.07	29.13	29.14	54	63	61	North.....	Northwest...	Northwest...	Clear and cool.
	11	29.12	29.06	29	57	73	69	West	Southwest..	Southwest..	Hazy; showers; cloudy.
	12	29.04	29.05	29.08	60	61	67	West	Northwest...	Northwest...	Clear and pleasant.
	13	29.08	29.09	29.16	61	64	65	Northwest...	Northwest...	Northwest...	Fair.
	14	29.20	29.22	29.27	53	60	66	Northwest...	Northwest...	North.....	Fair.
	15	29.20	29.18	29.13	52	61	68	Northwest...	Northwest..	North.....	Fair.
	16	29.19	29.23	29.33	56	58	62	North.....	Northeast ..	East	Fair.
	17	29.42	29.43	29.44	50	60	58	Northeast ..	Northeast ..	North.....	Fair.
	18	29.50	29.48	29.43	54	57	66	Northwest..	South	South	Fair.
	19	29.39	29.32	29.22	52	58	68	East	Southeast...	Southeast...	Hazy.
	20	29.15	29.10	29.09	58	72	70	Northwest...	Southwest..	Southwest..	Hazy and cloudy.
	21	29.09	29.09	29.09	66	74	76	Southwest..	South.....	South.....	Cloudy; hazy.
	22	28.99	28.95	28.92	67	74	77	South.....	South.....	Southwest..	Cloudy; slight showers.
	23	28.90	28.92	28.92	70	74	74	South.....	South	Southwest..	Cloudy; heavy thunder showers.
	24	28.98	29	29.05	66	69	72	Northwest...	West.....	West.....	Fair.
	25	29.09	29.09	29.09	61	70	70	South.....	Northwest...	West.....	Fair.
	26	29.09	29.01	28.98	60	69	70	West	SE.; W....	West.....	Thunder showers around.
	27	28.96	28.98	29	65	70	78	South.....	West.....	West.....	Fair.
	28	29.04	29.05	29.03	64	68	71	West	South	South.....	Hazy; cloudy.
	29	29.02	28.99	28.95	66	71	83	South.....	Southeast...	South.....	Foggy; thunder.
	30	28.97	28.97	28.96	72	76	78	South.....	Southwest..	West.....	Foggy; showers; clear.

Barometer—average, 29.05; highest, June 28; lowest, June 27. Thermometer—average, 69.8; highest, June 29; lowest, June 3, 15, and 19.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
July	1	28.96	28.99	29.12	70	74	74	Southwest..	Northwest..	Northwest...	Raining; fair.
	2	29.18	29.17	29.16	66	72	72	Northwest...	West.....	Southwest..	Fair.
	3	29.12	29.04	28.96	65	67	68	Northwest...	Southeast...	SW.; SE...	Cloudy; showers.
	4	28.86	28.88	28.99	64	65	68	North.....	Northwest...	Northwest...	Squalls, clear, and cool.
	5	29.04	29.06	29.08	58	64	69	Northwest...	Northwest...	West.....	Clear and cool.
	6	29.07	29.02	28.97	61	66	71	West.....	Southwest..	Southwest..	Cloudy.
	7	28.90	28.96	29.03	67	71	77	West.....	West.....	North.....	Cloudy; clear.
	8	29.09	29.12	29.10	61	67	64	South.....	South.....	Southeast...	Foggy and cloudy; slight rain.
	9	29.04	28.98	28.96	63	74	80	Southeast...	Southwest..	South.....	Rain; cloudy; thunder showers at night.
	10	28.89	28.88	28 93	71	78	78	Southwest..	West.....	Northwest...	Fair.
	11	29.05	29.01	29.16	68	69	72	Southwest..	Northwest..	Northwest...	Cloudy; fair; cloudy.
	12	29.21	29.24	29.21	66	68	75	West.....	Northwest...	Northwest...	Cloudy; fair; cloudy.
	13	29.20	29.19	29.16	67	68	73	Northwest...	Northwest..	Northwest...	Cloudy; fair; clear.
	14	29.16	29.14	29.09	61	68	71	Northwest...	North.....	North.....	Fair.
	15	29.04	28.97	28.95	61	73	67	North.....	Southwest..	Southwest..	Foggy; slight rain; cloudy.
	16	28.94	28.93	28.92	67	70	79	Calm.....	SE.; W....	West.....	Cloudy; heavy thunder showers.
	17	28.95	28.95	28.94	70	75	81	Southwest..	Northwest...	Northwest...	Fog; fair.
	18	28.97	28.97	28.95	67	73	76	West.....	Southwest..	Southwest..	Cloudy.
	19	28.86	28.85	28.84	70	77	73	Southwest..	South.....	West.....	Cloudy; thunder showers.
	20	28.87	28.93	29.06	66	68	68	Northwest...	West.....	Northwest...	Squall clouds; fair.
	21	29.17	29.23	29.25	62	68	76	Northwest...	West.....	West.....	Clear.
	22	29.26	29.25	29.21	60	66	74	Southwest..	SW.; SE..	Southwest..	Fair.
	23	29.20	29.22	29.21	68	72	80	Northwest...	Southwest..	Calm.....	Hazy; fair.
	24	29.18	29.18	29.09	70	72	76	Southwest..	South.....	South.....	Cloudy; slight rain; cloudy; rain at night.
	25	29.04	29.06	28.97	69	75	78	West.....	West.....	West.....	Cloudy; thunder showers.
	26	28.92	28.90	28.86	70	75	76	West.....	West.....	West.....	Fair.
	27	28.80	28.78	28.80	70	74	77	Northwest...	Northwest...	Northwest...	Fair.
	28	28.80	28.82	28.86	65	72	71	Northwest...	Northwest...	North.....	Squalls; cool.
	29	28.90	28.96	29.06	64	67	72	Northwest...	Northwest...	Northwest...	Fair; slight rain; cloudy.
	30	29.10	29.16	29.16	64	65	66	Southeast...	South.....	SW.; SE...	Fine rain; cloudy.
	31	29.22	29.24	29.22	62	63	66	Northeast..	East.....	West.....	Cloudy and misty.

Barometer—average, 29.03; highest, July 22; lowest, July 27. Thermometer—average, 69.6; highest, July 17; lowest, July 5.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
Aug.	1	29.22	29.22	29.20	59	63	68	Northeast..	Northeast..	West.....	Fair.
	2	29.19	29.19	29.19	57	61	74	Calm.....	Northwest...	Northwest...	Foggy; fair.
	3	29.20	29.20	29.20	58	64	73	South.....	South.....	Calm.....	Fair.
	4	29.24	29.15	29.23	62	66	71	Northwest...	South.....	Southeast...	Cloudy.
	5	29.20	29.22	29.23	67	71	76	East.....	Southwest..	West.....	Raining; fair.
	6	29.29	29.27	29.22	64	68	76	Southwest..	South.....	West.....	Fair.
	7	29.16	29.10	29.07	64	72	76	West.....	West.....	Southwest..	Fair; showers; fair.
	8	29.17	29.19	29.17	68	74	78	Northwest...	Northwest.	Southwest..	Hazy.
	9	29.06	29	29	69	75	77	West.....	Southwest..	Northwest...	Fair; showers from northwest; clear.
	10	29.12	29.14	29.12	62	64	74	Northwest...	South.....	Northwest...	Fair.
	11	29.11	29.08	29.05	59	68	73	Northwest..	South.....	Southeast...	Clear; cloudy.
	12	29.06	29.09	29.10	69	74	79	West.....	Northwest...	Northwest...	Clear; fair.
	13	29.16	29.17	29.14	64	77	78	West.....	West.....	Northwest...	Foggy; slight rain; fair.
	14	29.07	29.05	29.02	72	68	69	Southwest..	West.....	Northwest...	Cloudy; slight rain; clear.
	15	29.03	29.02	29.02	57	62	68	Northwest...	Northwest...	North.....	Fair.
	16	29.06	29.08	29.07	55	62	67	West.....	Northwest..	Northwest..	Fair; cloudy.
	17	29.08	29.06	29	63	62	62	Southwest..	Southeast..	East.....	Stormy; cloudy; heavy showers in the night.
	18	29.05	29.12	29.16	60	65	67	SW.; NW.	Northwest...	Northwest...	Fair.
	19	29.24	29.26	29.25	55	60	67	West.....	Northwest...	Northwest...	Fair.
	20	29.25	29.22	29.18	57	63	64	West.....	Southeast...	Southeast...	Fair; cloudy; rain in the night.
	21	29.20	29.20	29.19	60	62	63	East.....	Southeast...	Southeast...	Misty rain all day.
	22	29.04	29.04	28.99	64	67	72	South.....	Southwest..	Southwest..	Heavy rain, with thunder; cloudy; heavy thunder showers last night.
	23	29	29	28.99	68	71	78	West.....	West.....	Southwest..	Fair.
	24	29.07	29.07	29.07	62	67	75	North.....	West.....	West.....	Fair.
	25	28.98	28.96	28.90	63	78	77	West.....	Southwest..	Southwest..	Hazy and hot; cloudy; high wind and some rain at night.
	26	28.95	29.02	29.17	65	61	64	North.....	North.....	North.....	Clear and cool all day.
	27	29.31	29.33	29.31	52	64	67	North.....	Northwest...	Northwest...	Frost; clear.
	28	29.35	29.35	29.35	51	56	68	North.....	Northwest..	Northwest...	Foggy; clear.
	29	29.35	29.35	29.35	53	59	69	South.....	South.....	Southwest..	Foggy; clear.
	30	29.32	29.26	29.24	56	63	72	Southwest..	Southwest..	South.....	Foggy; clear.
	31	29.26	29.25	29.25	58	68	74	Southeast...	West.....	Northwest...	Hazy; cloudy.

Barometer—average, 29.15; highest, August 28 and 29; lowest, August 25. Thermometer—average, 66.2; highest, August 8 and 23; lowest, August 28.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
Sept.	1	29.32	29.35	29.34	67	70	74	Northwest..	Southeast ..	West.....	Cloudy all day.
	2	29.25	29.11	29.06	65	65	70	South.....	Southwest...	Northwest .	Light rain; clear.
	3	29.10	29.17	29.23	60	65	68	West.....	North.....	Northeast ..	Clear; cloudy.
	4	29.29	29.31	29.31	60	64	72	Northeast...	North.....	Southwest..	Foggy; fair.
	5	29.34	29.33	29.32	60	69	75	North.....	South.....	West.....	Foggy; fair.
	6	29.31	29.31	29.27	66	70	78	North.....	South.....	South.....	Fair.
	7	29.28	29.29	29.27	68	74	78	East.....	Southeast ..	South.....	Hazy; fair; halo round moon.
	8	29.29	29.29	29.27	70	74	82	Northwest..	Southwest...	Southwest...	Cloudy; fair and hot.
	9	29.29	29.30	29.29	70	74	80	South	Southeast ..	South.....	Fair and very dry.
	10	29.30	29.29	29.28	74	79	78	Southeast ..	South.....	West.....	Foggy; thunder shower; cloudy.
	11	29.28	29.26	29.25	71	78	80	Northwest..	West.....	West.....	Foggy; fair.
	12	29.26	29.19	29.17	69	80	77	West.....	West.....	South.....	Foggy; heavy shower, with high wind.
	13	29.09	29 06	28.99	69	74	78	Southwest..	Northwest..	West.....	Foggy; fair; shower; cloudy; rain in the night.
	14	29 26	29 32	29.35	61	60	66	West.....	Northwest..	North.....	Cloudy; clear and cool.
	15	29.49	29.51	29 54	49	51	59	East.....	West.....	Northwest..	White frost; clear.
	16	29.55	29.53	29.52	47	56	57	Northwest..	Northwest..	Northwest..	White frost; clear.
	17	29.53	29.53	29.40	46	52	61	Northwest..	Northwest..	Northwest..	White frost; clear.
	18	29.50	29.43	29.39	48	53	64	Northwest..	Northwest..	Southwest...	Foggy; clear.
	19	29.32	29.27	29.24	49	57	65	South.....	Northwest..	Southwest...	Foggy; clear; cloudy.
	20	29.24	29.22	29.19	56	61	71	West.....	Southwest...	West.....	Clear.
	21	29.18	29.17	29.17	59	67	69	West.....	West.....	West.....	Fair; cloudy; raining moderately.
	22	29.32	29.32	29 36	61	69	59	Northeast...	Southwest...	Southwest...	Light rain; raining moderately.
	23	29 21	29.08	28 86	56	56	59	East.....	Southeast ..	Southwest..	Stormy; raining moderately; rain last night.
	24	29.04	29.10	29.18	52	51	58	Northwest..	Northwest..	Northwest..	Fair.
	25	29.29	29.27	29.20	40	48	56	South.....	South	Southeast ..	Heavy frost; clear.
	26	29.10	29	28.95	43	52	58	Northwest..	Southeast ..	Southwest...	Heavy frost; cloudy.
	27	28.90	28.90	29.29	55	61	64	South.....	South.....	Southeast ..	Cloudy.
	28	28.93	28.93	28.93	60	61	63	East.....	Southeast ..	South.....	Rainy; flying clouds.
	29	29.05	29.05	29	54	56	58	South.....	South.....	Southeast ..	Fair; rain at night.
	30	28.98	28.99	29.05	52	56	54	Northwest..	Northwest.	Northwest..	Cloudy and squally.

Barometer—average, 29.23; highest, September 16; lowest, September 23. Thermometer—average, 63.1; highest, September 8; lowest, September 25.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon	Night.	Morn.	Noon.	Night.	
Oct.	1	29 10	29.14	29.14	49	50	58	Northwest..	Northwest..	Northwest..	Clear and cool.
	2	29.20	29.20	29.12	42	48	55	Northwest..	Northwest .	Southwest...	Hazy.
	3	28.90	28.80	28.76	50	53	55	Southwest..	Southeast ..	Northwest..	Thunder showers; stormy.
	4	28.79	28.79	28.98	53	58	54	North.....	Northwest..	Northwest..	Stormy; squalls.
	5	29.10	29.15	29.17	49	52	54	Northwest..	Northwest..	Northwest .	Hazy; cloudy.
	6	29 27	29.26	29.25	50	52	59	Northwest..	Northwest..	Northwest..	Fair.
	7	29.30	29.30	29.30	47	55	62	North.....	Northwest..	Northwest..	A beautiful day.
	8	29.33	29.33	29 33	48	53	70	Southeast ..	North.....	South.....	Indian summer.
	9	29.37	29 36	29.36	53	60	67	Northwest..	Southeast ..	Northwest..	Foggy; Indian summer.
	10	29.33	29.33	29.26	54	55	67	Southeast ..	Southwest...	Southeast ..	Foggy; Indian summer.
	11	29 24	29.22	29.20	58	62	66	Northwest..	Southeast ..	Southeast ..	Foggy; hazy; cloudy.
	12	29.14	29.07	29.03	60	64	64	Northeast ..	Northeast...	Northeast ..	Foggy; mist; cloudy.
	13	28.88	28.75	28.80	64	67	63	Northeast ..	Southwest...	Northwest..	Raining; squalls.
	14	28.98	29.02	28 96	51	58	58	Northwest..	Southwest...	Southwest...	Cloudy.
	15	29	29.10	29.16	51	50	55	West.....	Northwest..	Northwest..	Fair.
	16	29.30	29.30	29.30	42	46	52	Northwest..	Northwest..	Northwest..	Frosty and clear.
	17	29.30	29.30	29.25	42	50	53	North.....	Southwest ..	South.....	Clear and pleasant.
	18	29.24	29.24	29.09	47	52	56	South.....	South.....	Northeast...	Cloudy; misty rain; rainy night.
	19	28.73	28.67	28.65	53	55	55	Northeast ..	Northwest..	Northwest..	Stormy.
	20	28.83	28.84	28.97	48	52	56	Northwest..	.....	West.....	Fair.
	21	28.95	28.95	29.03	50	63	60	Southwest...	Southwest...	Southwest...	Fair; cloudy; showers at night.
	22	29.07	29.06	29	53	53	65	Southwest...	Southwest..	Southwest...	Cloudy all day.
	23	29.09	29.09	29.16	43	43	46	Northwest..	Southwest...	Southwest...	Fair; squalls; clear.
	24	29.12	29.10	29	36	42	49	Calm.....	Southwest...	Southwest ..	Clear.
	25	28.86	28.77	28.67	44	48	51	Southwest...	Southwest...	Southwest...	Cloudy; high wind in the night.
	26	28.68	28.69	28.65	47	45	44	SW.; NW..	Northwest..	Northwest..	Cloudy all day.
	27	28.66	28.70	28.89	38	36	39	North	Northwest..	Northwest..	Cloudy; snow squalls.
	28	29.04	29.04	29.04	35	39	49	Southwest...	Southwest...	Southwest...	Hazy; cloudy.
	29	29.10	29 20	29.10	43	47	56	Southeast ..	Southeast ..	Southeast ..	Cloudy all day; rainy night.
	30	28.97	28.90	28.83	57	60	60	East.....	South.....	Southwest...	Stormy; thunder showers.
	31	28.84	28 90	28.92	53	53	52	Northwest..	Northwest..	Northwest..	Fair.

Barometer—average, 29.05; highest, October 9; lowest, October 19 and 26. Thermometer—average, 51.4; highest, October, 8; lowest, October 28.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
Nov.	1	28.98	28.96	28.91	43	48	50	Northwest..	Northwest..	West.....	Frost; hazy all day.
	2	28.66	28.64	28.62	48	50	54	South.....	SW.; SE...	Northwest..	Rain; cloudy.
	3	28.60	28.60	28.59	48	45	44	Northwest..	North.....	Northwest..	Cloudy; snow squalls.
	4	28.60	28.60	28.60	36	36	34	Northwest..	Northwest..	Northwest..	Cloudy and blustry.
	5	28.80	28.83	28.93	34	36	37	Northwest..	Northwest..	West.....	Cloudy.
	6	29	29.05	29.10	32	37	37	Northwest..	Northwest .	Northwest..	Frost; cloudy and windy.
	7	29.16	29.16	29.16	32	37	42	Northwest..	Northwest..	Northwest..	Fair.
	8	29.16	29.16	29.13	32	36	42	Southwest..	Southwest...	Southwest...	Fair; cloudy.
	9	29.16	29.19	29.18	40	41	41	West.....	Southwest ..	Northeast..	Cloudy all day; rain and snow at evening.
	10	29.10	29.09	29.22	39	40	39	East.....	Northwest..	North.....	Rain; cloudy; clear.
	11	29.50	29.55	29.63	30	32	36	Northwest..	Northwest..	North.....	Frosty and clear; clear.
	12	29.67	29.61	29.50	27	30	37	West.....	South.....	Southwest...	Fair; cloudy; slight hail at night.
	13	29.28	29.25	29.20	35	36	36	Northwest..	Northwest..	Northwest..	Cloudy all day.
	14	29.12	29.05	28.87	35	35	34	Southeast ..	South.....	East.....	Stormy mist, freezing as it falls; rainy night.
	15	28.60	28.51	28.60	36	38	39	Southeast ..	Northwest..	Northwest..	Stormy; cloudy and windy.
	16	28.97	29.04	29.07	38	40	40	Northwest..	Northwest..	West.....	Cloudy all day.
	17	29 05	29.05	29.10	40	41	41	Northwest..	Northwest..	West.....	Flying clouds all day; light snow at night.
	18	29.19	29.19	29.18	38	39	38	West.....	Northwest..	West.....	Clear; cloudy.
	19	29.19	29.20	29.20	33	38	43	West.....	Southwest...	Southwest...	Frost; pleasant; cloudy.
	20	29.22	29.17	29.10	36	38	39	Northeast ..	Southeast ..	Southeast ..	Cloudy all day; heavy gale in the night and storm.
	21	28.56	28.44	28.42	39	41	42	Northeast ..	Southeast ..	Northwest..	Stormy; cloudy.
	22	28.58	28.68	28.80	38	39	39	West.....	West.....	West.....	Snow squalls all day.
	23	28.98	28.99	28.98	37	38	38	West.....	Northwest..	Southwest.,.	Cloudy.
	24	28.97	28.97	29 09	35	35	39	N.; NW...	Northwest..	Northwest..	Cloudy.
	25	29.14	29	28.35	37	39	36	Northwest..	Northeast ..	.....	Cloudy; snow in the afternoon.
	26	28.35	28.45	29	31	34	35	Northwest..	.....	.....	Windy.
	27	29.25	29.25	29.10	26	30	36	Northwest..	East.....	.....	Frost; clear.
	28	28.40	28.35	28.50	36	38	36	East.....	West.....	Northwest..	Rainy; squally.
	29	28.85	28.92	29	35	39	39	Northwest..	West.....	West.....	Cloudy and windy.
	30	29.07	29.07	29.12	33	36	35	Northwest..	West.....	Northwest..	Fair; cloudy and windy.

Barometer—average, 28.97; highest, November 12; lowest, November 25, 26, and 28. Thermometer—average, 34.5; highest, November 1; lowest, Nov. 27.

Meteorological Record for the year 1851—Continued.

		Barometer.			Thermometer.			Wind.			Remarks.
		Morn.	Noon.	Night.	Morn.	Noon.	Night.	Morn.	Noon.	Night.	
Dec.	1	29.15	29.13	29.11	28	29	27	Northwest..	Northwest..	Northwest..	Windy; fair; clear.
	2	29	28.85	28.80	22	25	27	Northwest..	Northwest..	Northwest..	Hazy and windy all day; halo round the moon.
	3	28 80	28.83	28.85	24	26	27	Northwest..	Northwest..	Northwest..	Cloudy and blustry all day.
	4	28.97	29.01	29.05	26	28	28	Northwest.	Northwest..	Northwest..	Snowing; cloudy and blustry all day.
	5	29.22	29.29	29.33	25	29	31	Northwest..	Northwest..	Northwest..	Cloudy; fair; cloudy.
	6	29.50	29.52	29.50	25	29	33	Northwest..	Northwest..	Northwest..	Clear all day; hazy at evening.
	7	29.42	29.33	29.27	28	33	35	South.....	SW.; SE...	SW.; SE...	Cloudy; light rain; rain at night.
	8	29.07	28.89	28 83	36	40	43	SW.; NW..	West.....	West.....	Cloudy all day, with rain squalls.
	9	29.08	29.10	29.14	32	34	32	Northwest..	Northwest..	Northwest..	Very blustry all day.
	10	29	28.85	28.70	30	32	35	West.....	West.....	West.....	Cloudy; blustry.
	11	28.87	28.96	28.99	28	27	28	Northwest..	Northwest..	Northwest..	Cloudy and windy; cloudy.
	12	28.95	28.84	28.75	28	30	32	SW.; SE...	Southeast ..	Southeast ..	Very cloudy; cloudy all day.
	13	28.68	28.68	28.77	34	33	29	West.....	Northwest..	Northwest..	Cloudy; squalls.
	14	29.01	29	28.91	18	21	23	SW.; SE...	South.....	Southeast ..	Cloudy all day.
	15	28.70	28.61	28.58	26	29	32	Southeast ..	Southeast ..	Southeast ..	Cloudy; slight snow.
	16	28.74	28.79	28.88	20	20	21	Northwest..	West.....	West.....	Clear all day.
	17	28 90	28.92	28.90	10	12	14	Northwest..	West.....	West.....	Clear all day.
	18	28.84	28.81	28.80	10	13	16	West.....	Northwest..	West.....	Clear; cloudy.
	19	28.80	28.75	28.66	16	20	25	Southwest...	Southwest...	West.....	Clear all day.
	20	28.50	28.60	28 77	24	27	27	Southwest...	West.....	Northwest..	Cloudy and squally all day.
	21	29 04	29.07	29.13	20	21	23	West.....	West.....	West.....	Cloudy and windy; cloudy.
	22	29.20	29.15	29.10	20	23	25	East.....	East.....	East.....	Slight snow all day.
	23	29.01	29.10	29.22	24	25	25	Northwest..	Northwest..	Northwest..	Cloudy; fair and cold.
	24	29.29	29.20	29	15	17	19	Northwest..	Southwest..	Southeast...	Slight snow; heavy snow squall.
	25	28.94	29	29.06	27	29	31	Northwest..	Northwest..	Northwest..	Cloudy; blustry; cloudy; snow at night.
	26	29.22	29.30	29.46	18	20	20	Northwest..	Northwest..	Northwest..	Fair; clear; very clear.
	27	29.50	29.48	29.43	12	10	17	Variable....	East.....	East.....	Hazy; looks like a storm.
	28	29.10	29	28.98	25	31	35	Southeast ..	Southeast ..	Southeast...	Raining fast; rain; cloudy.
	29	29.09	29.15	29.18	37	40	44	NW.; SE..	West.....	South.....	Cloudy all day.
	30	29.16	29.12	29.07	34	39	41	South.....	Southeast ..	Southeast...	Frosty; foggy and cloudy all day.
	31	29.05	28.97	28.78	40	42	42	Northeast ..	SE.; NE....	Northeast ..	A rainy day.

Barometer—average, 29.01 highest, December 6 lowest, December 15. Thermometer—average, 26.6; highest, December 29; lowest, December 27.

Monthly average.

Months.	Barometer.	Thermometer.
	°	°
January	29.02	32.8
February	29.19	36.3
March	29.04	43.4
April	28.96	49
May	29.08	57.8
June	29.05	63.8
July	29.03	69.6
August	29.15	66.2
September	29.23	63.1
October	29.05	51.4
November	28.97	34.5
December	29.01	26.6
Average of the year	29.06.5	49.54

Warmest day of the year, September 8.
Coldest day of the year, December 27.

The foregoing record was kept at Beaver Brook, Sullivan county, State of New York, elevated about 500 or 600 feet above the level of the sea. The barometer is placed in a hall not immediately subject to the influence of a change of temperature. The record of the thermometer is, therefore, no guide for the out-door temperature, especially in winter. The temperature of summer, as it would be in the shade, would probably agree pretty well with the record. The out-door temperature in winter, in extreme cold weather, would be (from actual experiment) from 10° to 20° lower than indicated by this record.

The foregoing has been prepared principally under my personal observation. When absent from home, I have had to depend on others. The figures I believe to be correct; but, when absent, the wind and atmospheric changes have not been noticed as particularly as I might wish. Having no weather-vane, the wind is noticed only to the nearest main point.

CHAS. J. WOODWARD.

Beaver Brook, *January* 1, 1852.

N. B. The time of observation has been, generally, sunrise, noon, and sunset. C. J. W.

METEOROLOGICAL OBSERVATIONS FOR 1851, MADE AT CANANDAIGUA, NEW YORK.

By Professor N. T. Clark.

Months.	Maximum temp.	Minimum temp.	Range of temp.	Mean temperature.	Amount of rain.	Amount of snow.	Total fall of water.	No. of days upon which rain fell.	No. of days upon which snow fell.
	Deg.	Deg.	Deg.	Deg.	Inches.	Ins.	Inches.		
January - -	45	4	41	28 1/2	1/2	4	1	2	10
February - -	55	2	53	30 3/4	2 3/4	12	4	9	7
March - -	71	11	60	36	1	10	2	3	12
April - -	65	24	41	45	3 1/4	2	3 1/2	11	3
May - -	80	30	50	56 1/2	3 3/4	-	3 3/4	14	
June - -	92	40	52	64	2 1/4	-	2 1/4	16	
July - -	92	50	42	67 3/4	3 1/2	-	3 1/2	22	
August - -	85	46	39	67	1 1/2	-	1 1/2	12	
September -	91	35	56	61 1/4	2 1/4	-	2 1/4	12	
October - -	72	29	43	49 3/4	1 1/2	-	1 1/2	13	3
November -	62	18	44	40	2	10	3	7	13
December -	52	5	57	23 1/2	1/2	24	3	4	15
For the year -	92	5	97	47 1/2	24 3/4	62	31 1/4	125	63

Table showing the quantity of rain that fell in Philadelphia, from 1845 to 1851, from an account kept at the Pennsylvania Hospital.

Months.	1845.	1846.	1847.	1848.	1849.	1850.	1851.
January	3.76	4.63	4.73	2.03	0.73	4.77	1.23
February	4.74	3.33	4.57	1.44	2.61	2.87	3.11
March	2.41	4.60	4.70	2.75	5.47	4.75	3.47
April	2.58	2.11	0.58	1.54	1.75	2.66	4.56
May	1.60	3.44	1.57	4.90	4	6.50	4.81
June	3.72	3.30	3.30	4.43	2.19	2.03	3.43
July	2.76	4.60	2.77	3.28	2.93	5.97	2.52
August	7.30	6 27	3.18	1.71	6.97	8 33	2.55
September	2.16	0.25	8.07	1.81	1.40	7.73	1.13
October	2.53	2.44	3	3.75	5.60	1.09	3.02
November	2.50	7.97	2.83	2.34	2.60	3.32	3.35
December	3.96	3.44	5.79	5.01	5.84	4.51	2.27
Total	40.02	44.38	45.09	34.99	42.09	54.54	35.55

METEOROLOGICAL STATEMENT FOR 1851 AT ALL SAINT'S PARISH, WACCAMAW, S. C.

OBSERVATIONS KEPT BY REV. A. GLENNIE.

Months.	Thermometer. Max.	Thermometer. Min.	Range.	Mean of max.	Mean of min.	Mean.	Greatest fall.	Greatest rise.	Mean of dew-point, 2 p. m.	Rain. Days.	Rain. Inch's.	Snow.	Sleet.	Dew, nights.
	Degrees.	*Degrees.*	*Deg.*	*Degrees*	*Degrees.*	*Degrees.*	*Degrees.*	*Degrees.*	*Deg.*					
January	17th, 70	31st, 19	51	55.46	41.74	48.60	13th, 14th, 60 to 29—31	14th, 29 to 57—28	44.87	12	3.31	..	2	13
February....	28th, 78	1st, 21	57	58.21	46.42	52.31	16th, 17th, 60 to 30—30	18th, 38 to 59—21	47.82	6	2.57	..	..	16
March	16th, 78	4th, 34	44	65.58	49.41	57.49	7th, 8th, 76 to 46—30	11th, 37 to 64 / 20th, 35 to 62 —27	46.00	8	2.19	..	..	17
April.....	30th, 81	15th, 43	38	69.00	54.53	61.76	8th, 9th, 75 to 51 / 11th, 12th, 71 to 47 —24	11th, 46 to 71—25	48.60	9	2.89	..	..	15
May.....	23d, 90	3d, 47	43	77.25	62.22	69.73	1st, 2d, 75 to 52—23	3d, 47 to 70 / 12th, 56 to 79 —23	57.80	5	1.77	..	..	18
June.....	4th, 90	1st, 56	34	80.60	69.90	75.25	4th, 5th, 90 to 69—21	1st, 56 to 77—21	68.63	14	7.24	..	..	19
July.....	28th, 93	20th, 66	27	84.06	74.48	79.27	19th, 20th, 89 to 66—23	20th, 66 to 83—17	72.67	17	10.74	..	..	21
August.....	12th, 89	29th, 63	26	83.19	74.38	78.78	26th, 27th, 85 to 70—15	30th, 64 to 79—15	72.87	12	7.35	..	..	19
September....	14th, 84	29th, 48	36	77.43	64.83	71.13	29th, 30th, 71 to 49—22	29th, 48 to 71—23	64.13	7	1.42	..	..	25
October.....	13th, 79	28th, 35	44	72.35	56.51	64.43	26th, 27th, 69 to 36—33	28th, 35 to 62—27	57.93	6	1.89	..	..	27
November...	2d, 76	7th, 8th, 32	44	61.30	46.43	53.86	25th, 26th, 67 to 36—31	9th, 39 to 67—28	49.30	10	3.73	..	..	20
December..	10th, 29th, 69	18th 19th 19	50	53.45	38.00	45.72	26th, 27th, 66 to 33—33	29th, 41 to 69—28	42.83	5	1.43	1	..	21
										111	46.53	1	2	231

The thermometer was highest, July 28th—93°. The thermometer was lowest, January 31st, December 18th and 19th—19°. Range, 74°. Mean temperature, 64°.49. Mean of dew-point, 2 p. m., 56°.12.

Meteorological statement—Continued.

Months.	BAROMETER. Maximum.		BAROMETER. Minimum.		Range.	Mean of maximum.	Mean of minimum.	Mean.	Greatest fall.	Greatest rise.	WIND. N.	NE.	E.	SE.	S.	SW.	W.	NW.	Varying between— NE.	E. by S.	SW.	W. by N.	Variable.	Summer, W. morning, SE. forenoon, SW. afternoon.
Jan...	19th,	30.48	2d,	29.50	.98	30.17	30.08	30.12	2d, .60	18th, .41	5	6	..	....	2	5	1	1	3	.....	6	1	1	.....
Feb...	19th,	30.58	4th,	29.80	.78	30.22	30.15	30.18	20th, .20	25th, .23	....	....	....	....	..	No	reco	rd.	....	.....	....	.....	..	.....
Mar...	26th,	30.47	17th,	29.70	.77	30.18	30.13	30.15	7th, .21	19th, .29	1	1	1	....	3	2	2	1	3	4	5	2	6	.....
April.	10th,	30.36	19th,	29.54	.82	30.04	29.95	29.99	13th, .48	20th, .30	....	....	4	....	1	1	....	....	6	1	6	9	2	.....
May..	25th,	30.35	5th,	29.69	.66	30.18	30.11	30.14	4th, .40	5th, .33	....	2	2	....	3	3	...	....	3	6	3	1	1	7
June...	18th,	30.33	7th,	29.78	.55	30.10	30.03	30.06	20th, .19	9th, .24	....	....	1	....	1	....	1	....	8	.....	5	.....	2	12
July..	12th,	30.27	19th, 29th,	29.92	.35	30.10	30.04	30.07	13th, .20	31st, .16	....	....	..	....	1	4	3	..	3	4	2	.....	3	11
Aug..	29th,	30.28	24th,	29.63	.65	30.14	30.07	30.10	24th, .44	25th, .27	1	4	..	....	3	2	....	....	5	2	7	.....	1	6
Sep.	16th, 17th,	30.42	27th,	29.83	.59	30.17	30.13	30.15	13th, .14	14th, .23	4	8	1	2	..	....	....	2	6	3	....	1	3	.....
Oct....	7th,	30.33	26th,	29.55	.78	30.12	30.04	30.08	26th, .32	27th, .48	2	4	..	....	..	1	....	2	10	.....	5	2	5	.....
Nov...	12th,	30.44	21st,	29.62	.82	30.13	30.01	30.07	20th, .42	26th, .43	2	6	2	....	..	....	6	1	3	2	3	1	4	.....
Dec.	6th, 7th,	30.57	15th,	29.67	.90	30.22	30.11	30.16	2d, .30	26th, .37	3	3	1	....	1	5	1	7	1	1	2	1	5	.....

The barometer was highest, February 19..... 30.58
Do .....lowest, January 2..... 29.50

Range..... 1.08

CLARKSVILLE, HABERSHAM COUNTY, GEORGIA,
January 28, 1852.

DEAR SIR: Enclosed I send you a condensed statement of the temperature of the atmosphere at Clarksville, by a Fahrenheit thermometer, for portions of the years 1847, 1848, and 1849, at sunrise, 2 o'clock p. m., and 9 o'clock p. m., kept by Robert Campbell, esq. No record having ever been kept for an entire year is the reason why this statement embraces only portions of the respective years.

Yours, respectfully, &c.,

J. VAN BUREN.

Hon. THOMAS EWBANK.

Thermometrical Observations at Clarksville, Habersham county, Georgia, 1,615 feet altitude above the ocean, in the years 1847, 1848, 1849.

BY ROBERT CAMPBELL, ESQ.

Time.	Minimum.	Maximum.	Average.	Monthly average.
1847.	°	°	°	
June, sunrise -	53	73	65.06	
2 p. m. -	70	85	76.03	
9 " -	64	72	68.23	
				69.77
July, sunrise -	57	71	66.35	
2 p. m. -	70	84	76.00	
9 " -	62	74	69.42	
				70.59
August, sunrise -	60	70	66.16	
2 p. m. -	72	84	78.00	
9 " -	64	74	70.36	
				71.51
September, sunrise -	44	72	59.05	
2 p. m. -	63	82	73.76	
9 " -	50	76	65.57	
				66.13
October, sunrise -	30	64	47.48	
2 p m. -	58	77	68.96	
9 " -	40	68	56.68	
				54.35

Thermometrical Observations at Clarksville—Continued.

Time.	Minimum.	Maximum.	Average.	Monthly average.
1848.	°	°	°	°
June, sunrise	51	72	64.67	
2 p. m.	72	86	78.43	
9 "	63	75	70.10	
				71.07
July, sunrise	59	72	66.55	
2 p. m.	72	85	79.36	
9 "	67	76	71.84	
				72.58
August, sunrise	56	72	66.26	
2 p. m.	70	84	78.13	
9 "	66	74	71.13	
				71.84
September, sunrise	36	68	54.75	
2 p. m.	58	84	73.48	
9 "	48	76	62.85	
				63.69
October, sunrise	30	60	47.52	
2 p. m.	55	77	67.06	
9 "	40	64	54.39	
				56.32
November, sunrise	18	58	34.33	
2 p. m.	38	69	52.07	
9 "	26	59	43.03	
				43.13
December, sunrise	25	66	44.57	
2 p. m.	35	72	52.89	
9 "	32	65	47.86	
				48.44

Thermometrical Observations at Clarksville—Continued.

Time.	Minimum.	Maximum.	Average.	Monthly average.
1849.	°	°	°	°
June, sunrise	60	70	64.26	
2 p. m.	66	83	77.00	
9 "	62	74	69.18	
				70.15
July, sunrise	54	70	66.00	
2 p. m.	69	82	76.00	
9 "	60	73	69.00	
				70.34
August, sunrise	58	70	66.20	
2 p. m.	71	84	82.16	
9 "	64	75	70.71	
				73.01
September, sunrise	40	66	56.47	
2 p. m.	67	83	73.62	
9 "	52	70	63.20	
				64.46
October, sunrise	29	68	47.00	
2 p. m.	54	74	62.45	
9 "	42	68	53.60	
				54.35

Comparison of monthly averages.

Months.	1847.	1848.	1849.
	°	°	°
June	69.77	71.07	70.15
July	70.59	72.58	70.34
August	71.51	71.84	73.01
September	66.13	63.69	64.46
October	57.84	56.32	54.35
Total	335.84	335.50	332.31

VIII.

MISCELLANEOUS.

SEEDS RECEIVED FOR DISTRIBUTION.

Particular attention has been given to the collection of seeds for distribution during the past year; and a larger amount of money has been expended by the Office for this object than during any previous year. The arrival of the foreign seeds was unfortunately delayed till the season had become somewhat advanced; but the whole, with the exception of those delivered to members of Congress, heads of departments, &c., were sent by mail, within three days of their arrival, to every State and Territory of the Union.

In addition to those procured by purchase, many curious and valuable seeds have been sent for distribution from gentlemen both at home and abroad.

Through the agency, and at the suggestion, of M. Alex. Vattemare, there were sent by M. Louis Vilmorin, of Paris, an almost complete collection of the varieties of French wheat in ear, besides a quantity of seeds of grains, grasses, and vegetables. M. Randon, Minister of War, sent samples of the agricultural products of Algiers. These seeds were received and distributed by the Department of the Interior.

From C. F. Hagedorn, esq., Bavarian consul general, were received some olive-tree seeds; also, an assortment of vegetable seeds; and a parcel, containing a new and very prolific variety of rye, sent by the Agricultural Society of Bavaria.

Commodore J. H. Aulick, commander of the East India squadron, having been requested by the Secretary of the Navy to procure valuable plants, seeds, &c., suitable for cultivation in the United States, several cases of cuttings and roots of sugar-cane were sent home by him. They were received at the Department of the Interior, and were thence distributed among the sugar-planters of Louisiana and the neighboring States. A box of Cape of Good Hope wheat, also sent by Commodore Aulick, was received at the Patent Office, and was promptly distributed, through members of Congress and others, to every wheat-growing State in the Union.

Seeds have likewise been sent to the Patent Office by the following gentlemen:

Jacob Hewes, esq., of Leipenville, Delaware county, Pennsylvania.

Thomas Affleck, esq., Washington, Mississippi—a sack of Egyptian oats.

John P. Brown, esq., Constantinople. (The seeds never reached the Office.)

John Moreland, esq., Havana—Cuba tobacco.

Jeremiah Balthorpe, esq., Salem, Virginia—large Indian corn.

Lieutenant Hunter, Fairfax county, Virginia—large oats.

Lewis W. Busher, esq., Avon, New York—superior tobacco, of fine flavor, and very productive.

—— Calvert, esq., Prince George's, Maryland—white corn.

B. P. Johnson, esq., Secretary of the New York State Agricultural Society—an assortment of seeds.

A. Denny, esq., Eaton, Preble county, Ohio—sample of a new species of flaxseed.

Milton A. Haynes, esq., Cornersville, Giles county, Tennessee—a paper of catalpa seed.

Hon. J. M. Bernhisel, delegate from Utah—specimens of Californian, New Mexican, and seven-eared wheat.

H. R. Day, esq., Indian agent in Utah—wheat in the ear; three varieties.

Messrs. Warren & Co., Sacramento city, California—a small package of flower seeds.

Lieutenant J. W. Gunnison—a package of grass seed collected in the Utah valley.

Wm. D. Gillespie, esq., Lexington, Tennessee—specimens of stock pea grown by the Indians in Florida, of upland rice, flour, corn, and water-melon seed.

John B. Robinson, esq , Elk Creek, Erie county, Pennsylvania—some yellow corn.

Correspondence relating to Sugar-cane brought from the East Indies.

NAVY DEPARTMENT,
June 24, 1852.

SIR: Transmitted herewith, for your information, is a copy of despatch No. 21 and its enclosures, received from Commodore John H. Aulick, commanding the United States squadron in the East India and China seas, in relation to the sugar-cane which he has sent home in the "Marion," in obedience to instructions from this Department.

I am, very respectfully, your obedient servant,
WILL. A. GRAHAM.

Hon. A. H. H. STUART,
Secretary of the Interior.

[No. 21.]

U. S. STEAM FRIGATE SUSQUEHANNA,
HONG KONG, *February* 12, 1852.

SIR: In my despatch No. 20 I mentioned having touched at Penang, on my way through the Straits of Malacca, and procured cuttings and roots of the Salangore sugar-cane for seed, in obedience to your order of

the 9th of May last. I also obtained a few samples of the Otaheite and Mauritius canes, which some planters at Penang prefer to the Salangore.

I had them all selected, and put up in various ways for transportation, by an experienced late manager of a sugar plantation there, as is shown by the enclosed letters from our consul at Penang, and Mr. Vermont. Some of these roots and cuttings are now growing finely in boxes and tubs. They will be sent on board the Marion to-morrow, and I think they may, with great care, reach home alive.

I enclose a list and description of the cane from Mr. Simons, the gentleman who procured them for me.

I have the honor to be, sir, respectfully, your obedient servant,

J. H. AULICK,

Commanding U. S. Squadron, East India and China Seas.

Hon. WILL. A. GRAHAM,

Secretary of the Navy, Washington, D. C.

—

PENANG, *January* 16, 1852.

SIR: According to the request I received from you through C. C. Currier, esq., the American consular agent at Penang, I have the honor of sending you—

No. 1. One box, marked S, containing 139 Salangore sugar-cane tops.
No. 2. One box, marked S, containing 137 Salangore sugar-cane tops.
No. 3. One box, marked O, containing 85 Otaheite sugar-cane tops.
No. 4. One box, marked O, containing 71 Salangore sugar-cane tops.
One open case, marked S, containing 6 Salangore cane plants.
One open case, marked O, containing 6 Otaheite sugar-cane tops.
One open case, marked O, containing 2 Salangore cane-roots.

The tops in the boxes Nos. 1, 2, 3, 4 are packed in their native earth, according to the way in practice here and other sugar colonies, for importation and exportation of sugar cane tops, and of the best description. Should these boxes be placed in a dry and cool place, most of the tops they contain may arrive in good order, although I would have more confidence in the two open cases if on board they may be kept free from contact with salt water, watered now and then, and filled with earth as the canes grow. By the latter mode the Mauritius cane has been imported here from the Mauritius in 1845. I beg, also, to send two Salangore cane-roots. Allow me to add that all due attention has been paid to the choice and packing of the cane tops.

Here enclosed I beg to forward the certificate supplied to me by the manager of the estate on which the Salangore cane-tops have been cut and the roots procured.

I have the honor to remain, sir, your most obedient servant,

H. SIMON,

Late Manager of Kream Estate, in Prince Wellesley.

Commodore AULICK,

U. S. Steam Frigate Susquehanna.

PENANG, PRINCE OF WALES ISLAND,
January 16, 1852.

I, the undersigned, manager of the sugar estate called "Otaheite," belonging to Messrs. Brown & Co., of this place, certify to all whom it may concern, that the cane tops supplied by me to Captain H. Simon, for the United States war steamer Susquehanna, are taken from ripe canes, cultivated here upon the generality of European and native sugar estates, as the real Salangore cane described by Mr. Leonard Wray in his "Practical Sugar Planter."

The two roots are also from the Salangore cane.

JAMES VERMONT.

PENANG, PRINCE OF WALES ISLAND,
January 17, 1852.

SIR: I have the honor to reply to your requisition relative to the Salangore sugar-cane, having made every inquiry regarding that description of cane. I find, from the best authority, that the largest portion of cane now under cultivation in this island and the settlement of Province Wellesley is of that description; and that at Salangore (which is a native Malay State) sugar-cane is cultivated merely for supplying the wants of the inhabitants of that section of the country, and not for the production of sugar as an article of merchandise. I would therefore strongly recommend that the plants which you require should be selected and taken from the plantations of this island and Province Wellesley; and I have employed Mr. Henry Simon to procure and put up, in the best possible manner, six boxes of cane-cuttings, of which he has given a full description in a letter of this date addressed to yourself, which I beg herewith to hand you. Mr. Simon is a practical sugar-planter; and having had the advantage of superintending an estate in this settlement under the direction of the author of the publication entitled the "Practical Sugar-Planter," I have full confidence in his knowledge of the particular description of cane you require, as well as of all other descriptions now under cultivation in the Straits of Malacca.

I have the honor to be, sir, your most obedient servant,

C. C. CURRIER,
Consular Agent of the U. S. A.

Commodore AULICK,
Commanding U. S. Squadron,
East India and China Seas, Steam Frigate Susquehanna.

Letter respecting Wheat brought from the Cape of Good Hope.

U. S. STEAM FRIGATE SUSQUEHANNA,
HONG KONG, *February* 10, 1852.

MY DEAR SIR: I send to your address by my son, an officer of the United States psloo Marion, a box containing about half a bushel of *Cape*

of Good Hope wheat, said to be of very superior quality. It is cultivated—but in no considerable quantity—in about the latitude of 33° south. I learn from our consul at Cape Town, that a sample of this grain has been tried in one of our northern wheat-growing States, but did not turn out very well, owing, probably, to the too great severity of the climate. It may, however, answer better in the more congenial region of our southern grain States, and I beg the favor of you to cause its distribution accordingly. I would also be much obliged to you if you would send a few samples of it to my brother, Mr. Charles A. Aulick, for himself and his three sons, all farmers, near Falmouth, Pendleton county, Kentucky.

I am, with great respect, yours, &c.,

J. H. AULICK,
Commanding East India Squadron.

THOMAS EWBANK, Esq.,
Commissioner of Patents.

ON CHESS IN WHEAT.

BROOKVILLE, INDIANA, *January* 8, 1851.

SIR: Though not actively engaged in agricultural operations now, I have spent the greater part of my life on a farm, and, whatever others may have thought, considered myself a skilful farmer. Since I have been differently employed, I have always felt much interest in that occupation, and have cast many a delighted look over luxuriant fields and well tilled and productive farms, and have made many an inquiry as to the method of cultivation which had produced such valuable results. I trust, therefore, that I shall not be considered an intruder in this department of science. I am a passionate admirer of good farming. I think that we may always judge with unerring certainty of the character of a man by seeing his farm. If I were a money-lender, which, by the way, I am not, I would ask no better security for a loan than to see the borrower's house and barn in good repair, fences well kept up, fence-corners clear of bushes, wet lands thoroughly ditched, corn free from weeds, and wheat from chess, rye, and cockle. Such a farmer, if he has a neat and tidy wife, is sure to prosper. One who neglects all these never can.

My present object is to state some facts concerning the culture of wheat, in opposition to the belief that wheat will change to chess.

This notion, once so prevalent, has, if I mistake not, lost many of its advocates since the days of better farming have come, and, I believe, will some day be entirely exploded. It is a very convenient theory, though, to cover up the faults of careless wheat culture; and many advocates of it will still, no doubt, be found among those who will not take the trouble to fully test the matter. Much time will be required to wholly disprove the theory. The greater portion of wheat is full of chess, and considerable labor is necessary to separate them. The fields, too, are full of it; for successive crops have fallen upon them, and it has often been sown there. It is known to be a hardy plant, the seeds of which will probably germinate after having lain in the ground several

years. That seeds of many varieties will thus lie in the ground for a long period, and then send forth their plants, is an undisputed fact. For instance, every farmer knows that white clover will spring up abundantly in fields where none has grown or been sown for five or ten years, and where it must have lain in the earth during the whole period; unless we adopt a still more extravagant theory than that which we have been considering, and suppose that not only wheat, but corn, rye, oats, barley, pumpkins, and potatoes, all change to chess. It is a curious fact in point here, that wheat found in the folds of linen enclosing an Egyptian mummy, germinated and grew luxuriantly, though it had, doubtless, been lying there 3,000 years. This fact has been several times published. I am clearly of opinion that if no chess was in our fields, and none was ever sown in them, or carried there by birds or other animals, we would never again hear of such a change as of wheat to chess, even though all the seed sown were shrivelled, (as was the case in 1849,) or sown on the top of the ground, or injured by a severe winter, or pastured off in the spring—all of them supposed to contribute to this result. I will state some of the facts which produced in me such a conviction of the truth of the above opinion, that conclusive testimony alone could change it.

It is now probably 15 years since my father determined to raise wheat alone, instead of wheat, rye, chess, and even cockle, as he and his neighbors had been doing. The rye, being taller than the wheat, was easily destroyed by cutting it out before harvest, and the cockle was likewise soon overcome. As to destroying the chess, the neighbors laughed at him, saying that the first hard winter would again change the wheat to chess, and his labor would all be lost. Nevertheless, he undertook the experiment. I was then a youth at home. We picked the seed carefully, head by head. Lest a single grain might have got into it, we run it two or three times through a fanning mill containing a good screen, each time entirely separating the screenings from the seed. We then sowed it on the cleanest ground that we had. We went through a similar process the two succeeding years. Whenever a head or grain of chess was found in harvesting, threshing, or winnowing the wheat, it was carefully pocketed, carried to a fire, and burned. By this time it was almost perfectly clear of the noxious weed, and would have been entirely so, I have no doubt, had there been none of the seed in the ground. After this, it was only necessary to screen the seed well in order to secure at harvest a crop of almost pure wheat. Several years have passed since then, and I think I may safely say that not a grain of wheat has changed to chess on that farm, though it has been exposed to all the casualties that are commonly supposed to produce the change. I will even venture the prediction that not a grain ever will change. It matters not what field has been sown, what the circumstances of sowing, what the character of the winter may have been, what casualties may have befallen it—such as cattle pasturing it, or fly eating it—the result has been invariably the same; as far as chess was concerned, almost entire freedom from it. Our neighbors, seeing the success of the experiment, have adopted a similar practice, and with like result; so that the opinion, once generally entertained, has now few advocates among them, or in the adjoining counties.

I have detailed this experiment at considerable length, not merely for the purpose of disproving what I conceive to be an erroneous opinion, but for the beneficial effect its disproof would have on careless farmers. Many who now raise from three to ten bushels of chess per acre would, if they did not believe this pernicious doctrine, soon raise as much wheat in its stead. It will take some time, as well as labor, to rid old farms of this unprofitable weed. But three years will more than repay both—in the larger yield of wheat, and the better quality of flour.

Besides the facts which I have given, I will say a few words by way of argument of the question. The theory is contrary to nature. We do not find that other plants change. Then why should this? Different varieties of the same plant intermix; but the seed of one plant does not produce another distinct and altogether different from its parent plant. It is just as reasonable to suppose that chess will change to wheat; yet we never hear of such a change as that. If there are changes, why are they not mutual? Because the laws of God forbid it, which laws are written, not only in the works of nature around us, but also in the book of Revelation, which speaks thus: "The herb shall bear seed after its kind, and the fruit tree after its kind." Again: "Do men gather grapes of thorns, or figs of thistles?" And again: "A good tree cannot bring forth evil fruit; neither can a corrupt tree bring forth good fruit;" or, to change the terms, wheat cannot bring forth chess; neither can chess bring forth wheat.

Chess often grows in meadows, from which it has been supposed by some that timothy will also change. The one change is just as likely to take place as the other; but is it not most strange, apart from all other considerations, that two plants, so different as wheat and timothy, should each change regularly into another and the same plant? If the ground was clear, the notion that timothy changes would soon be exploded.

Chess is probably a hardier plant than wheat, and thus flourishes where wheat has been frozen out, or, from any other cause, has not grown well. It seems to commence its growth later in the spring, so that where the wheat is good, it is choked, and makes little show; but where the wheat has been injured, the small stalks spread into large stools, and produce abundantly. The same result follows where the seed sown has been partially picked up by birds, or left uncovered and perished.

Such a change is contradictory to all known chemical principles, and as inconsistent with reason as that a walnut tree should bear oranges, or a fig tree produce oysters.

Yours, respectfully,

JOS. BRADY.

Hon. THOMAS EWBANK,
Commissioner of Patents.

TRIPOLI IN ALABAMA.

TALLADEGA, ALABAMA.

SIR: Supposing it desirable that every resource of our great republic should be developed, I have thus intruded on you, for I do not know

whether mineralogy is embraced in the Patent Office Reports or not; but if it be an intrusion on your business, please pass it by, and impute it to ignorance. I have sent you a small specimen of what I suppose to be *tripoli*, hitherto unknown as a native of the United States—at least so far as I have learned. I have called it tripoli, though it may be some other mineral; for I do not profess to be well learned in mineralogy. It is called chalk by the common people, and used as such, and is found in a cave of what I suppose to be, in mineralogy, called mountain limestone. The geological character of this region is rather hard to be understood, but I believe its formation is what we call primitive, or plutonic, though not far from newer formations. This cave is situated in Talladega county, Alabama, one mile east of the Coosa river. A few miles west the coal fields set in, and continue in a western direction from fifty to one hundred miles. This coal formation is supposed to be immense, and is of good quality. Fifteen or twenty miles south there are immense quarries of fine white and variegated marble, and a quarry of lithographic stone, (*very fine.*) My limits will not admit of giving a mineralogical or geological history of this region; but it abounds in valuable minerals. There appears to be a large amount of this mineral, (which I call tripoli,) and it is easily quarried. Should it prove to be of good quality, we need not import it hereafter.

Very respectfully, yours, &c.,

JOHN HUBBARD.

The Commissioner of Patents.

Smithsonian Institution, *April* 15, 1852.

Dear Sir: The specimen of earth sent by John Hubbard, esq., of Talladega, Alabama, to the Office of Patents of the United States, has been submitted by me to a careful microscopic examination, and was found to be *tripoli* of the finest quality.

I am not aware of the quantity of tripoli imported yearly into the United States, but however small it be, if we have it in our country, let us make use of it; and if Alabama possesses extensive beds of that earth, it might be made of still more general use.

I remain, dear sir, yours, very truly,

C. GIRARD

Thos. Ewbank, Esq.,
Commissioner of Patents.

AGRICULTURAL BUREAU.

The insfitution of an agricultural bureau by the general government has been a subject of public discussion for years, and is now (as it has repeatedly been) under the consideration of Congress. The legislatures of several States have passed resolutions in favor of its organization, and so have agricultural societies in various sections of the Union. Agricultural writers have inculcated its importance, and practical men have repeatedly urged the necessity of it in their communications to this Office.

Presidents Taylor and Fillmore have followed the example of Washington, in calling the attention of Congress to the subject. All that has been done towards carrying these views into effect is the employment of a temporary clerk in the Patent Office, whose salary, and the cost of purchasing and distributing seeds, &c., have been borne by the Patent Fund.

While some object to a bureau for the promotion of agriculture on constitutional grounds, and contend that every great industrial interest of the country has equal claims upon Congress, others are averse to its establishment from a belief, or fear, that it would become more or less subservient to political and party purposes. There is, however, an institution already organized by Congress to which no such objections can apply: it is national in its character, purposes, and location; it possesses the requisite means and appliances—funds, buildings, a scientific corps, library and apparatus; and would seem, therefore, peculiarly adapted to prosecute one of the most important purposes of a bureau—a purpose in strict accordance with the will of its founder. The design of Smithson, as evinced by his employing the comprehensive and familiar term "*knowledge*"—not *science*—in his will, and by his selecting the most practical of all people as his trustees, was to add to and spread abroad the elements of material civilization—not solely to cultivate the higher or abstract sciences, for which philosophical associations abounded, and abound. With Franklin, he estimated science according to its practical value; and the sentiment is becoming more and more that of the enlightened world.

The propriety of establishing in the Smithsonian Institution a department of Agricultural, and one also of Mechanical science, with suitable appropriations, to aid in working out *the great practical problems of the day*, is respectfully suggested for the consideration of Congress. In this institution every citizen has an interest, and upon it a claim to all the information it can impart. To it might be referred the analysis of ores, soils, fertilizers, and vegetable products, together with propositions for the increase of speed in vehicles for traversing land and water, the application of electricity and the gases as motive agents, the extension of known materials to new manufactures, the evolution of new principles and processes, and, in a word, for everything calculated to meet the progressive demands of agriculture and the arts. To it the Patent Office might be authorized to refer, for experimental proof, claims for patents involving doubtful points in chemistry and natural philosophy, &c.

By thus identifying itself with the active agents of modern progress, by taking up new and important problems in agricultural and mechanical science, and giving right directions for their solution, its benefits would be felt throughout the length and breadth of the land. It would increase and diffuse, not merely interesting information among savants, but substantial and fruitful knowledge "among men," and men of all climes; for it is idle to suppose that the discovery of any valuable fact in practical science can now be held for the exclusive benefit of one people: it would be rapidly proclaimed in every civilized section of the planet, and credit would be returned to the source whence it emanated.

The epoch of vegetable chemistry is but opening; yet it already offers a prospect than which one more varied and attractive never invited the attention of philosophers, or promised higher honors to discoverers. We

have as yet done but little in this prime department of research, although it is fraught with novel elements of national wealth and of national glory. Probably the greatest of human achievements for a century to come are to be made in it—greatest, as regards sublimity of discovery, and magnitude and beneficence of results.

The successful efforts of MM. Naudin and Lecoq in taming the hitherto intractable thistle family, and rendering them fit for human food, are examples of what is already being accomplished in this branch of research—one that will afford employment for the highest intellects, and reward the labors of enterprising agriculturists through all coming time.

"While M. Naudin hopes to produce a thornless thistle for the better nourishment of four-footed beasts, M. Lecoq places a thistle upon his own table and eats it himself, thorns and all. He entitles his letter read to the Academy, 'Two hundred, five hundred, or even a thousand new vegetables, *ad libitum*.' He had noticed the instinct of the ass invariably directing him to the thistle bed; and, confident that that serrated plant possessed some precious qualities that are not generally acknowledged, he took a few specimens of the tribe under his care, cultivated them carefully, and finally turned out 'a savory vegetable with thorns of the most inoffensive and flexible sort.' Continuing his experiments, he finally tamed every individual member of the fierce family of thistles—the Hercules thistles, *Cirsium eriophorum*, the *Heracleum spondylum*, and other redoubtable individuals. Encouraged by his success, he undertook the mollification of several tyrants of the vegetable kingdom more ferocious still, if possible, and encountered no serious resistance. In all this M. Lecoq claims no discovery, and conceals no secret. His only mode of transformation is to expose to the sun plants that grow in obscurity, and conceal from the solar influence plants that flourish in the open air, and thus entirely alter their nature. He simply employs upon vegetable productions hitherto misunderstood and neglected the most common processes of the gardener's art. The acrid, aromatic properties of cress, parsley, chevoil, &c., are retained by allowing them to grow in the sun; the acridity of celery, on the contrary, is made to disappear by burying it in the sand; the crudity of certain sorts of lettuce is removed by binding the leaves tightly together, and excluding the light and the air. The entire nature of the plant is thus transformed; and it is by means as simple as these that M. Lecoq has made the thistle eatable, and holds out to us the hope of soon eating dock and pigweed with as much relish as asparagus and green peas. He asserts that by means of overturned flower-pots he can render alimentary all the cruciferous, all the umbelliferous, and all the syrantherous species, and that certain of the most despised and degraded among them will yet claim the place of honor at the festive board."

Inquiries into the forms and structure of coleoptera, algæ, &c., of antiquities, astronomy, language, ethnology, &c., are undoubtedly interesting, and ought to be pursued; but they are not incompatible with equally interesting and important researches into the organisms and means of improving esculent grains and grasses, fruits and roots, and the means of developing new plants for both food and materials of manufactures; nor need they exclude inquiries into the capabilities of domestic animals and their untamed relatives, since the progress of

society imperatively demands corresponding advances in all that relate to these essential agents and elements of civilization. Under the influence of ideas now nearly obsolete, savants once shrank from contact with popular processes and pursuits; but barren speculations are no longer preferred to fruitful realities, and the time has gone by when philosophy could not, without a sacrifice of her dignity, take up common things.* A good example, in this respect, has already been furnished by the French republic of 1848, one of the first of whose acts was to found the "*Institut Agronomique National*" at Versailles. A part of the buildings of the palace, and about fifty acres of its grounds, were devoted to this object. A corps of the ablest professors in the country was formed; and "superior instruction" in practical agriculture and chemistry is given. At the laboratory analyses of soils and manures are gratuitously made, and information is constantly imparted to those who may desire it.

Among the professors, one is charged with the department of zootechnie, or everything relating to rearing and improving the breed of animals; another professor has the department of agriculture and mechanics; another that of ruled economy, or the exposition of such laws and principles of political economy as bear upon the functions of the farmer.

Then, as regards mechanical science, France has the "*Conservatoire des Arts et Métiers*," with its museum of models, and laboratory for analysis, where lectures on science applied to the arts, general information upon dye stuffs, metals, &c., &c., are gratuitously given.

So with us let the two grand industrial interests of our republic and of the world be in like manner directly represented in an institution founded for the benefit of mankind at large. Let our agriculturists have their Liebig, and our mechanics have their professors—men selected for their devotion to and extensive knowledge of the arts of industry—to whom they can resort for instruction and for advice in cases of difficulty and doubt.

Of the facts and results obtained by the proposed departments in the Smithsonian Institution, those of immediate or permanent interest might be announced monthly or quarterly in cheap or gratuitous tracts, or they might be embodied in annual reports to Congress, and circulated like other public documents. The benefits emanating from the Institution would thus be greatly augmented, and would be brought more directly within the reach of the entire body of our people; nor could a more consistent employment of a part of the testator's bequest, or one more certain of public approval, be named. It would "increase and diffuse knowledge" among those who are best able and anxious to turn it to profitable account. Pre-eminently catholic in its character and design, there is nothing to prevent the Smithsonian from becoming one of the most cherished institutions of the age.

Respectfully submitted:

THOMAS EWBANK,
Commissioner of Patents.

[* See kindred sentiments well expressed by Professor Turner, of Illinois, in his "Plan for the State University," copied in this Report, p. 37.]

APPENDIX.

The present Report having already exceeded the usual number of pages, only the following communications of those deferred from the Report of 1850 are inserted:

DOVER, NEW HAMPSHIRE, *January* 7, 1851.

SIR: Your Circular sent to me, requesting information on the various branches of agriculture in our part of the State, was duly received. I herewith transmit to you replies to some of the inquiries which have come under my observation and experience:

Wheat.—We do not cultivate wheat much in our part of the State; we consider it an uncertain crop. Some of our farmers, recently, have been sowing the winter wheat, and speak of it as doing very well. I am not able to give much information on that subject.

Corn I consider one of the best crops we cultivate. The middling size eight-rowed early yellow-seed, and the eight-rowed white-flint corn, I believe to be the two best and most profitable kinds of seed. I have planted different kinds of seed—the large eight and twelve-rowed; but this large seed corn takes longer to ripen, and it does not fill out so well—there is too large a space between the rows on the cob; it will not shell out so much, and will not weigh so much a bushel. My method for ploughing and planting is as follows: Plough the sward ground in the fall of the year—say in September; the more grass and second crop you turn under the better; plough deep—say from seven to nine inches: this is of great importance; harrow the ground well in the spring, as soon as the frost is out and it is dry enough to make it mellow and fine; furrow both ways with a small one-horse plough, about three feet each way; put about half a shovelful of fine compost manure in the corner of the furrows for the hill. I consider a small quantity of manure in the hill to be of great importance to the crop. The corn comes up quickly, is strong, and gets an early start. After it gets up about a foot high, the roots get hold of the old sward, and then it will go ahead, if you keep the weeds and grass down. Drop five or six kernels in the hill on top of the manure. If it comes up too thick, pull out at second hoeing. Four spears in a hill are better than more.

I plant my ground in corn but one year in succession, sowing down to grain the second year with hay seed. Good corn land is worth from $50 to $100 per acre.

Cost of raising one acre of corn:

Seed	$0 25
Interest on land	4 00
Ploughing and harrowing	4 00
Planting	3 00
Hoeing	5 00
Harvesting	4 00
Shelling	2 00
Manure	5 00
Cost	27 25

Crop, fifty bushels, at 75 cents per bushel - - -	$37 50
Corn-fodder on one acre when hay is worth $10 per ton - -	6 00
	43 50
Cost - - - - - -	27 25
Gain - - - - - -	16 25

Oats, Barley, Rye, Peas, and Beans.—Oats I consider to be the best and ost profitable crop of grain at this time; yield, from 20 to 50 bushels per acre, price, from 35 to 60 cents per bushel; seed per acre, from two to three bushels. Barley, 20 or 30 years ago, yielded well, and made good feed for hogs and cattle; but for the last few years the crop has fallen off and been very light. Cause unknown to me. Rye, peas, and beans, not much cultivated for market. Hay is the best and most profitable crop we can cultivate for market; yield, from one to three tons per acre. Clover and herdsgrass are the best for market; seed per acre, a half bushel of herdsgrass and six pounds of clover. This, I think, is about the right quantity.

We press our hay in bales from 250 to 400 pounds each, and send to Boston and other markets on the railroad. Price varies from $10 to $20 per ton; common price about $14 at market; average price with us $10.

Hogs.—The middling size white breed, I think, is the best; black hogs are no favorites of mine. Pork-raising for market, in our part of the country, since we have lost the potato crop by rotting, I think is an unprofitable business. We cannot raise pork as cheap as the farmers in the western States. I do not think corn worth more than 35 or 40 cents per bushel to make pork at the price it has been selling for in our markets for the last few years—say from $5 to $6 50 per hundred weight. Grain ground and cooked, I think, is decidedly the best, and should be given to hogs warm in cold weather.

Root Crops.—Turnips, carrots, and beets are all good roots to cultivate as a field crop. I should hardly know how to get through the winter with my cattle and hogs without some kind of roots. I succeed best with the ruta-baga turnip. Sow on old ground, in good condition, that has been cultivated one year; plough deep; harrow and pulverize it well a few days before sowing.

I like the plan best of sowing seeds in hills made by the common hoe—say two feet apart, about the same distance we plant white beans. At second hoeing, thin out all but two or three plants in a hill. Let them stand as far apart as possible. The great secret in cultivating roots is to have them thin enough to grow large; they will not do well if too thick on the ground; yield, from 400 to 800 bushels per acre.

Potatoes.—I cannot speak quite so well of potatoes at this time. Until within a few years they were considered to be one of the best root crops we cultivated, both as to home consumption and market value. We depended very much on them for fatting our beef and pork; but within the last few years the disease has taken hold of them and almost entirely destroyed the crop. I have not seen anything written on the subject to satisfy me as to the cause of it. Some have thought the rot was owing to the old seed, that the potatoes had been planted too long and had run out; but I am satisfied that is not the case. One year ago last spring, I sent to Buffalo, New York, and ob tained a paper of potato seed—about a teaspoonful, with directions how to cultivate them. I sowed them in a hot-bed early in the spring. When the plants got to be three or four inches, I transplanted them in my garden, one plant in a hill, about two feet apart; hoed and cultivated them the same as other potatoes, and, to my surprise, the crops grew quite large, and at harvest time I found almost all kinds, colors, shapes, and sizes, from a pea to a turkey's egg; yield, about one and a half bushel. When I took them out of the

cellar last spring to plant, I found at least one half of them as diseased as any I had in the cellar. I planted, this last spring, those that were sound, and at harvest time in the fall, I found them almost all rotten. I think we shall have to give up cultivating potatoes at present, for it has been an unprofitable business the last four or five years in this part of the country.

Fruit Culture is having increased attention. Apples and pears I consider to be a very profitable crop for market, and for feeding hogs and cattle. Peaches, plums, and grapes do not suceeed so well with us.

Very respectfully,

THOMAS W. KITTREDGE.

COMMISSIONER OF PATENTS.

SOUTH BARRE, VERMONT, *January* 1, 1851.

SIR: Having received one of the Circulars from your Office, the object of which is to collect information on the various branches of agriculture, I will give you a few facts, to which I have been an eye-witness, and I am confident if they were generally known would benefit mankind.

Clover.—Northern clover is one of the most important crops for seed grass and hay we have. It is a grass which roots deeper, and consequently gets nutriment deeper down, than any other grass here grown. Its leaf is broader, and covers more surface, and it also absorbs more nourishment from the atmosphere than most other grasses, and of course does not impoverish land, in proportion to its value, more than many other kinds of grass.

In the year 1849 the season was very dry, and all crops were very light. I had eight acres of new stocked clover. I mowed it as soon as the grass was ripe, threshed it, and got two bushels of seed per acre. In 1850 the season was very wet, and the clover on the eight-acre piece above mentioned was very tall, intermixed with red-top and white clover, producing from two to three tons per acre. Clover seldom seeds as well the second year as the first. I noticed some seed in this. If I had let it all stand until the seed were fit to thresh, or mowed it all together, and let it lie until the chaff would thresh off, the hay would have been much impoverished, and the labor of handling it, together with the hay which would have been broken and lost in the chaff, would have been a great drawback on the crop of seed. To avoid all this, I took my cradle-scythe, which is four inches wide, and commenced cradling off the tops of the clover, taking off from four to six inches, (a man will cradle one acre per day.) I let the clover heads lie until they were dry, carted and threshed them with one-quarter the labor it would cost to mow and get them in the usual way. They yielded two bushels per acre. I mowed one acre of the stubble, and got one and a half ton of hay, which my cattle and sheep eat well. I then ploughed in the remainder, and shall probably get a good crop of wheat next year.

I will state my method of harvesting maize, (Indian corn,) which very much improves its value as an article of food. As soon as it becomes seared, cut it up, bind it with straw or grass in bundles which one man can handle, and hang it up on a pole, or joist, supported by props, or across a fence. Let it hang about three weeks, or until it gets dry; then husk and put the best ears into a crib, to be shelled when wanted for use.

In the year 1838, a road was laid through my farm three rods wide, on land of a black soil, the hard earth being within 18 inches of the surface. I ploughed the road, also a strip of land three rods wide each side of the road, and then scraped all the valuable soil from the strip three and a half rods wide (enough for the road and fence) on to the adjoining land each side of the road. The next spring I planted potatoes in it, and raised 400 bushels per acre, without

manure, (200 bushels being the average yield of the same land without this extra soil,) and it still continues to produce more than the adjoining land. I removed the soil from 15 square rods in a day with one team.

I will now state my method of making the road after this soil was removed. I commenced ploughing in the centre of the road; I ploughed it in the centre four times, (breaking the earth two rods wide,) then ploughed and scraped enough from the ditches to make a good road. It has required but little repair since, and will never need much, from the fact that it was made of hard earth, and there is nothing but hard earth within the bounds of the road to repair it with.

In 1846 I invented and put in operation an implement consisting of three rollers, or drums, for the purpose of rolling land in summer and roads in winter.* I have used it for four years past, and it has exceeded my most sanguine expectations in regard to its utility. One span of horses (weighing twelve hundred each) will roll from 20 to 25 acres per day. In winter, when the snow is one foot deep, four such horses will roll a road three miles per hour, leaving the track 12 feet wide, the snow being hard and smooth, and but three inches deep. On Monday, the 23d December, 1850, the snow fell in the vicinity where I live two feet deep, drifting on the road to the school-house one foot, making it three feet deep. On Tuesday we drew the roller over it twice, with three yoke of oxen and one horse, the weather being cold. On Wednesday I trotted my horse (weighing fourteen hundred) over this road, at the rate of eight miles per hour, drawing a sleigh and six persons, averaging in weight 120 pounds each, passing sleighs in perfect safety without breaking the trot, the horse's hoof not indenting the snow more than two inches, and the sleigh not cutting in more than half an inch. I have, in years past, commenced rolling when the first snow falls, repeating the rolling every snow storm, until, in some drifting places, the hard snow has accumulated to the depth of six feet, and have seen loaded teams pass each other as fearlessly and safely as an eagle will sail over our hills.

Another advantage is, that a wheel carriage is enabled, by the use of this roller, to run with ease and safety, enabling teams to cross over hills and vales in the spring, when the snow is melting and the ground is bare in spots. Again, when the snow is going off, it melts gradually, and does not gully the road, as it otherwise would. In 1848, one foot of snow fell in December. I rolled the road from my house to the village, (it being two miles.) Soon after the wind arose and blew the snow out of the road in spots, drifting it in other portions on all the roads in this vicinity. No more snow fell that winter. There was no good sleighing or wagoning on the roads that were not rolled all winter; but on the rolled roads we had both.

The cost of a triple roller here is $15, and I presume there are but few school or highway districts in Vermont, or in any of the neighboring States where snow abounds, which have not team enough to draw a roller. And it would be one of the greatest favors the State legislatures could confer on the people to pass an act requiring them to furnish themselves with rollers, and roll the roads of their respective districts every time the snow falls four inches. The same roller will be sufficient to roll the land for a whole district by putting on a body and a pair of thills to each roller—thus giving you three one-horse rollers.

[*The general nature of the implement, the details of which do not clearly appear from Mr. Thomson's drawing and description, is as follows: Two of the three rollers are placed in a line, on the same axle, four feet apart. The third one is placed some distance behind, and rolls over the space left between the two front ones. The front rollers are four feet long, each, and the rear one five feet. They are all four feet in diameter, and are made in the form of drums; the heads of two inch, and the staves of one and a half inch plank. The machinei oaded as occasion requires.]

In regard to the utility of rolling land there is some dispute. One class of men affirm that more hay will be obtained in a given number of years, if the grass is mown above the stones and ridges, than would be if the stones were removed and the land rolled smooth and mown close. But the dry season of 1849, in our vicinity, has induced many to abandon that theory. The grass did not head out that season, and was only from four to six inches high; consequently, the stone and ridge advocates had no hay for their cattle, while those who removed the stones and rolled the land had enough hay for their cattle, and some to spare.

In 1848 I sowed six acres of oats in one piece, on land of a black soil, with hard earth within 18 inches of the surface, sowing on two and a half bushels of oats per acre. I rolled it all, except a strip two rods wide, through the middle of the piece. It produced 65 bushels per acre where it was rolled, and 40 where it was not rolled The oats were one week earlier where it was rolled. The roller works well, as hundreds will testify. I am often asked why I do not get it patented. My reply is, if I can see it in general use, and have the privilege of travelling where it has been used, it will be remuneration enough for me.

Respectfully, yours,

JOHN THOMSON.

Hon. THOMAS EWBANK,
Commissioner of Patents.

LAFARGEVILLE P. O., TOWN OF ORLEANS, JEFFERSON CO., N. Y.,
December 21, 1850.

SIR: The most skilful husbandry remains unfruitful without propitious seasons. Unless cultivation is assisted by fertilizing rains, or unless, to use the words of the sacred writer, "He calleth for the waters of the sea and poureth them out upon the face of the earth," the labors and science of the husbandman are vain. Hence, in answering some of the questions of your Circular, the course of the weather being so intimately connected with agriculture as to reward or destroy, in the whole or in part, the labors of the farmer, it may not seem useless or uninteresting to say a word of the weather, as we often experience it in the northern part of this county during the season of tillage and harvest. The land being mostly level plateaux, gradually rising south from the Black river, and descending northerly towards the river St. Lawrence, or declining westerly towards Lake Ontario, it follows that we are almost surrounded by two powerful water-currents, which seem, by common belief, to act with great force of attraction upon the gathering clouds which come within the power of the current of these rivers, and often expose us to extremes of wet and dry weather. The south part of the county, being surrounded by highlands, east and south, is generally better favored by natural limits, and less subjected to the same extremes; and the clouds brought with the southwest wind from the Lake, after encountering these obstructions to their passage onwards, whirl round, open upon the country by refreshing showers, and thence roll down the Black river. Our springs are variable, and it is not until June that the weather becomes settled. The spring rains have, then, mostly past; it grows warmer—sometimes hot; and showers are often needed. Well, the clouds are gathering, lightning flashes, we hear the roll of distant thunder; the storm hovers around us for a while, as if uncertain which course to pursue; we hope and prepare for a shower; vegetation is suffering. Suddenly the clouds are set in motion, and, descending, follow the current of either river; and some parts of the country only, as they lie near or under the outer edge of the storm, receive a slight sprinkling. It is a common observation that the storm must gather

just so thick to overwhelm the current of the rivers; and then we get a succession of rainy days, or a spell of wet weather, as the farmers are wont to call it, followed again by another spell of dry weather; and were it not that during those often long intervals of drought we were blessed with a copious supply of the dews of heaven, all our hopes would nearly be blasted. Notwithstanding this local contingency of the seasons, we have not only seed time and harvest, but generally bountiful crops. Could we have our rains equally divided at reasonably short intervals, this would be one of the most productive regions of the world. To guard against these irregularities of the weather, we find it beneficial to plough deep, and to sow as early as the season will admit. By early sowing, we think, the plants get a good start before June. and, covering the ground, keep it from the drying influences of the sun and lessen evaporation; and by deep ploughing and mellowing the ground, besides promoting vegetation, the ground easier imbibes the rains or dews, and is better enabled to free itself from what might be superabundant. This year we had a long wet May, and crops were mostly got in late. This was followed by dry weather till the end of June, and made us fear a repetition of last year's drought. Then commenced a succession of storms of rain, wind, and hail, in some parts, which lasted during the season, causing a great growth of straw, laying most crops flat down to the ground, so that nothing but the scythe could be used, and perplexing and protracting the haying and harvesting to an unusually late time, and at nearly double the usual amount of labor. We have, however, had a good yield of all crops grown here; but I do not think the grain has generally so well formed and filled as otherwise, owing probably to the heavy straw and the many rains, keeping the heads down.

Corn has come in unusually good and heavy.

Potatoes were never more luxuriant in growth of tops, and the greatest crop was expected, when the rot made its appearance, and I regret to say that about one-half of the crop, at least, was affected, and mostly lost.

A few patches of winter wheat were raised, and what little was grown proved good, the midge doing very little or no damage. Our farmers here think that the only remedy against the midge is to stop raising wheat, or, to use their own words, to starve the weevils out. I think, myself, that this is the only safe remedy, unless we could procure such spring or winter varieties as will, by early or late sowing, grow in a manner to be out of danger during the short period of existence of the destroyer. The fact is, that since we have left off raising the old-fashioned varieties, the midge has already greatly diminished, and is expected entirely to disappear. I hear of a farmer in St. Lawrence county who raised, this year, a great crop of winter wheat, said to be of the Soule variety, which was harvested and threshed in July, without any damage from the midge. I was shown some of the wheat—a beautiful, white, plump berry; and, if the story proves true, this would be the winter variety suited here; but as long as the Black Sea spring variety will not degenerate, escape the midge, and readily sell at 80 cents the bushel, there cannot be great inducement here to raising winter wheat for one dollar.

In a former communication I have given the average yield of the several crops raised here per acre, and as to the quantity of seed to be sown per acre, though there seems to be a difference of opinion among practical farmers—some using more, some less seed. I have always had reason to be satisfied with sowing the quantities of seed set down, per acre, for the several crops in that same communication, excepting, when seeding down in the spring, I prefer sowing half a bushel less per acre, to prevent the grass and clover from being smothered by a too great growth of straw.

Peas are cultivated here as an alternate crop, to loosen, improve, and mellow the soil, for which, by completely shading the ground, they are peculiarly adapted. I have no doubt that worn-out lands might be reclaimed by plough-

ing a pea lay under; but unless clover is higher than $6 the bushel, it would be considerably more expensive; and upon the whole, where clover can be had, and will thrive, it is much preferable.

As fertilizers of meadows, drawing barn-yard manure in the fall on the highest knolls of the meadow, and then spreading it evenly, has been considerably practised within a few years, and I have myself derived great benefit from the practice. By this management those higher grounds run into a heavy sward, the wash, if any, settles, and enriches the lower parts of the meadow; and where the year previous but a scanty herbage grew, I generally cut, after thus manuring, a good, heavy swath, equal to any in the meadow; and if this process is coupled with the sowing of plaster, the spring following, the plaster will have a better effect in increasing the quantity of hay grown. Our meadows average from one to one and a half ton of hay per acre—sometimes two tons, on the best meadows. It costs us, per acre, from $2 to $3 to cut and secure the hay; and the common price of hay being $5 the ton, leaves the remainder as profit. The seeds used in laying down meadows are timothy and clover, and red-top on lowlands. Clover, however, seldom lasts over one winter, when it gradually runs out.

Dairy.—In cheese-making I have no experience. The prevailing opinion is that cheese dairies give less work and are more profitable. Whether this is actually so, I am unable to say. The fact is, that most dairies here have gone from butter to cheese-making. On comparing notes, however, with the yearly returns of cheese dairies where an equal number of cows were kept, I have uniformly found that there was, all things considered, little or no difference with the same yearly returns of butter-making on my farm, and that the difference in the profits altogether depended on the prices butter and cheese commanded in market. Good dairy cows can be bought here at from $12 to $15 in the fall, or from $20 to $25 in the spring. Milking qualities do not belong to any particular breed, and may be found, in my humble opinion, in all crosses; and even our natives often make excellent dairy cows. Allowing the cows to yield from 150 to 175 pounds of butter, and from 350 to 400 pounds of cheese, during the season, and taking the highest yield to establish estimates upon, we will arrive at the following results:

25 cows, at $20		$500 00
90 acres of land, at $20		1,800 00
Dairy utensils, &c.		75 00
		2,375 00
25 cows, at 175 pounds butter each, at 15 cents		$562 50
Drawn skins, (say,) worth		10 00
Skim milk, per cow, $2		50 00
		622 50
Deduct interest on $2,375, 12 months	$166 25	
Deduct expenses of cutting hay, making butter, &c.	120 00	
		286 25
Profit		336 25

The dairy being a cheese dairy, deducting $1 per cow for skim milk, the result will be in favor of butter if cheese sells at $6 per hundred, and in favor of cheese if it sells at $7 per hundred in market.

My cows are regularly milked twice a day, at equal intervals, evening and morning. The dairy room is a cellar, 28 by 38 feet, stone walls two feet thick

and seven feet high, with windows and doors to ventilate at all times when the temperature of the air outside will allow. The cellar is kept at the temperature of 60°, as near as possible, being guided by a thermometer in and outside the cellar. The cellar is kept clean and dry, (the drier the better,) and should remain free from anything that may communicate an offensive flavor to the milk or cream. The milk is strained in tin pans, filled to about eight quarts to a pan; these pans are set in movable racks, or frames, on two slats, each frame having seven tiers of these slats on each side of the frame, each holding ten pans, and each tier about five inches, or the height of a pan, apart. Thus each frame or rack holds 140 pans. On each side of these frames, from 12 to 14 feet long, and level with the first tier of slats, there is attached a projection a little over two feet from the floor, wide enough for two slats, and answering as a table to set the pans on when the milk is to be strained or skimmed. Here the milk remains from 30 to 36 hours, when it is skimmed, and shortly afterwards churned. The churning is performed by dog-power, which being more uniform than when done by hand, the butter comes harder and of finer grain. The churn used is a crank-churn. As soon as the butter has come, it is taken out of the churn, washed clean with cold, hard, well water, till the water leaves the butter as clear as when pumped from the well. It is then salted with a little over half an ounce of salt to a pound of butter, and the salt used is common New York salt, dried, made fine, and sifted. We never have suffered any inconvenience or damage from the use of it as above prepared. The butter, after being thus salted, is carried to the cellar, where it stands about 12 hours, or sufficient time for the salt to dissolve, when it is worked over, the clear brine extracted, and packed down as firmly as possible, by kneading with the hand, to make it one compact mass. (The tubs used are made of the heart of the wood, generally sound white ash.) These tubs hold 100 pounds of butter, and weigh from 11 to 14 pounds the tub. Previous to receiving the butter they are soaked a few days with a strong brine, made of salt and saltpetre. When the tubs are filled, the butter is covered with a wet cloth, and this cloth is covered with a layer of about an inch of salt, made moist, or paste-like, with water. The tub is then covered, and remains till the butter is taken to market, when the salt is taken from the cloth and the covers strapped. The price of butter ranges from 14 to 15 cents the pound; that of cheese from $5 to $6 per hundred.

In rearing *neat cattle* very little can be made, except, perhaps, turning off and converting into beef such loose fodder and hay as cannot very well be sold off from the farm, and giving the benefit of the manure. Manure being money on the farm, if no great profit is derived from raising neat stock, it can occasion no great loss. If well kept during our long winters, neat cattle will consume at least three tons of hay per head till they are three years old; and this, besides loose fodder, which, to say nothing of summer keeping, and putting hay at $5 per ton, and selling three-year-old cattle at $15 a head, is no money-making affairr

The growing of *wool* is not thought very profitable by our farmers. To illustrate this, they say 100 sheep will require 15 tons of hay, which, at $5 per ton, makes $75, for winter keeping; to this add $5 for washing and shearing 100 sheep, which is low; add, also, the summer keeping, which cannot be less than $1 25 a week, for six months, $30, making a total of $110. Add interest on cost of sheep, and you find the sum of $117. Now, then, most flocks will not average over three pounds of wool, or 300 pounds for 100 sheep, which, at 25 cents per pound, would give $75; to this add increase on flock of 100, say one-half, or 50, at $1, and the result being $125, the profit, if I am right, appears very small, indeed. Taking another view of the case, the result will be as follows.

36 acres, at $20			$720 00
100 sheep, at $1			100 00
			820 00
100 sheep, by 300 pounds wool, at 25 cents			$75 00
Increase			50 00
			125 00
Deduct interest on $820	$51 10		
Deduct washing and shearing	5 00		
Deduct cutting hay and taking care of	50 00		
			106 10
			18 90

One ton of hay is supposed to make about 14 pounds of wool; and if this be true, allowing the remainder of the yearly wool to be grown in summer, the bare wool-growing, at 25 cents the pound, would be, were it not for the increase of the flock, a rather unprofitable business.

Although the foregoing chapter on neat stock and sheep may not appear flattering as to profits, well regulated farms should not be confined to one single branch of farming, unless peculiarly doomed to it by nature; and where a mixed husbandry is practicable, there being no farming without manure, and no manure without stock, the farmer will find room, food, and profit for everything on the farm, and the whole will ultimately concur to balance, by large profits of one kind, the apparent small returns of another kind of husbandry.

About *potatoes*, I dare not say one word. The raising of this delicious and healthy edible has become so precarious by the mysterious disease that hangs over the crop, that the yield and cost of production per acre are uncertain, and the wisest know least what mode of cultivation is now best adapted to insure success and preservation from the rot.

On the subject of *hogs*, I must say that we make excellent pork in Jefferson. Farmers have not been slow in introducing the best breeds—such as the Berkshire, Essex half-black, the Woburn, and Suffolk, which are generally the varieties, and their crosses, found in the hog-yards. These varieties have fine flavored meat, are of a quiet disposition, fatten easy, some of the small-bone kind best for home consumption, and the larger or more raw-boned hogs more profitable for the barrel or market. The quantity of corn required to make 100 pounds of pork is a hard question, and one which I am now unable to answer. But I must amend what I stated in a former communication about the grinding of grain for food, as I am now convinced that there is a decided gain in the grinding of all grain, and then cooking it, for food, excepting peas, which may, perhaps, as well be cooked without grinding. We cannot make it profitable here to make pork for $5 a hundred, when corn and peas readily sell for 50 cents the bushel. Our pork, at that price, to remunerate, must depend on the dairy slops, and very little grain. I have carried to market, this year, pigs of the Berkshire breed, with a mixture of Essex half-black, which, fattened as above, and at six months old, weighed from 270 to 289 pounds, and sold for $4 75 the 100 pounds.

We have in this county all the elements of a fertile soil—an inexhaustible compound of silicious, calcareous, and aluminous matter, together with the primeval humus. To make arable land, it should be the study of the husbandman to keep all these matters mixed up in due proportions. The first three substances of the compound alone would become barren without a fair admixture of the latter; and this the humus or manure wears easier and sooner

away by constant ploughing and cropping than the three former. It becomes the duty of good farming not only to keep the soil well stirred by deep and good ploughing, to retain and mingle a fair proportion of these three first, but to keep the soil also well and often supplied with a due and rich proportion of the latter. Science and experience teach us that this can only be done by a judicious rotation of crops and the bountiful application of manure, when the land is kept under the plough. Hence manure-making should be the first trade of the farmer; and notwithstanding great improvements have already been made in the making and preserving of the manure made on the farm, there is no interest of the farm that requires and deserves more the continued attention and all the skill and care of the farmer.

All the stock of the farm is mostly kept in stables, or in yards, under sheds. The dung made in the stables is thrown in heaps outside of the buildings, where often it remains to be leached by the drippings of the roofs, or otherwise washed, and loses a good share of its virtues. The manure made in the yards, whether on a slope or on a level, unless collected and drawn out early in the spring, or stacked in heaps in the yard until it can be drawn out, is also left more or less exposed to the same deteriorating and wasting influences of sun, wind, and rain. The yards, whether on slopes or levels, become very muddy, and are rendered at times almost impassable, by the constant tramping of heavy cattle in the spring and fall, though ever so deeply littered with straw, or other refuse matter—so much so that they are dreaded by man and beast, and are very uncomfortable until winter sets in and freezes them up. To obviate all these defects, I would propose to dig cellars four, five, or more feet deep, and seven, eight, or more feet wide, the whole length outside of the stables; to have the floors of the stables so constructed to convey all the stale into the cellars, which should be made tight on the inside by well-built walls laid in water-lime mortar, and covered by a roof, and fenced outside by posts and bars to keep cattle from falling into them. All the manure made in the stable, being thrown into these cellars, would thus be preserved and protected. Next, I would conduct, by good eave-troughs, the rain-water of all the roofs out of the yard. I would then slope my yard by the plough and scraper, if the shape of the ground required it, from the buildings towards a cellar, to be dug the whole length of the yard on the opposite side of the buildings, making it of such width as would make it handy to remove the dung from it on either side. This cellar should be covered with a roof, to rest on stone pillars, or posts, about six or seven feet high above the ground, and be surrounded by a fence of bars and posts. The wash of the yard should be made to run into this cellar, or manure-house, and yard. Next, I would harden the bottom of my barn-yard by paving, flagging, or planking it; and the litter, when sufficiently worked into manure in the yard, could then easily be scraped, from time to time, to this manure shed, there to remain under cover until wanted. In this manner the manure would all be saved in its dry and liquid state; the yard would never be poached up, and become a hole of mud and mire, without bottom, unpleasant and injurious to man and beast; and the outlay would soon pay by the quantity and quality of the manure made; and it would certainly not cost half the labor to draw it out when wanted.

I cannot well close this communication without saying a word of the establishment of * * * at Albany, who, by their ingenious labor-saving implements, have well deserved of the farming community. I have had in use these three years a corn-planter, or seed-sower, of their make and invention. I have always regularly planted eight acres a day with it, the machine being drawn by a horse. It is equally well adapted to sowing small seeds—as onions, carrots, beets, ruta-bagas; and I consider it a valuable implement on the farm. I have now in use their newly-improved railroad horse-power, and, with the thresher and separator, it is the most economical and profitable machine that

I am acquainted with; and the cleaner, which they have recently added in lieu of the separator, has crowned their efforts in presenting the farmer with a threshing establishment, and a power to operate it, that can be second to none in efficiency, durability, economy, and comfort for man and beast, whether in the field or on the barn floor. The Michigan sod and sub-soil plough, which has been brought into my neighborhood, has given satisfaction to those who have used it, and will prove a valuable acquisition to the more thorough tillage of the land.

Another implement which has been recently used in this country is the independent horse hay-rake; and it is said by those who have used it, and those who have seen it work, that it will eventually supersede the old-fashioned revolving one.

Last, but not least, must I notice the steel cultivator teeth now used in the drag, or cultivator. Nine of these teeth are put in a triangular drag—four teeth in the side pieces, about 18 inches apart, and one tooth in the middle piece, and between the two first teeth in the side pieces, and about 12 inches each way between them, to work and stir the ground about six inches from centre to centre of each tooth. With this drag on sod turned over in the fall, or other fall-ploughed land, the land can be brought in a condition to receive the seed, and fully prepared much earlier in the spring, and before the plough can often be worked to advantage, being efficient in its operation, and mellowing the ground at one turn better than any implement formerly in use.

I remain, sir, very respectfully, your obedient servant,

JOHN N. ROTTIERS.

Hon. THOMAS EWBANK,
Commissioner of Patents.

SALEM, WASHINGTON COUNTY, N. Y.,
January 11, 1851.

SIR: Your Circular of the past year, containing numerous interrogatories, was handed to me by Mr. King, to whom it was addressed, for reply. I propose confining my reply to a single interrogatory—that which embraces *the curing of Pork Hams.*

When hams come first from the cutting-block they are usually jagged and ill-shaped. Saw off all superfluous shank, and trim the whole smoothly.

Formula for curing 100 *pounds.*—Take 4½ lbs. (four and a half pounds) ground rock-salt, 4 oz. (four ounces) saltpetre, and 4 lbs. (four pounds) brown sugar. Mix the salt and saltpetre, and with it thoroughly rub each ham all over, powdering it with the mixture, and pack down in a tight, clean cask, sprinkling over each layer its due proportion of sugar. (A molasses cask answers well when there is meat enough to fill it.) Head the cask tightly; and after four days commence rolling it briskly back and forth, so that the surface of each ham may be wet with the brine which shall have been spontaneously produced. Repeat the rolling at least three times a day (and the oftener the better) until the brine is wholly absorbed, when the meat is ready for the smoke-house.

Upwards of forty years ago my father adopted the plan of dry-curing, as it is called, substantially according to the above formula, using at first six (6) *quarts* of fine salt to 100 pounds of meat. For 20 years I have cured my meat in this way, gradually reducing the quantity of salt from six (6) *quarts* down to four and a half (4½) *pounds*, and with entire success in preserving it through the summer, excepting in one instance, when six pounds salt were used; but it was undoubtedly impure. Less than four and a half pounds pure salt to the 100 would probably preserve meat from taint, but would be found too fresh for the general taste.

If it were practicable at once to force mechanically as much salt into fresh meat as would preserve it, it would seem that such curing would be philosophically perfect. Its juices all preserved unchanged, the meat would be soft, palatable, nutritious, differing in no desirable quality from the same article when fresh. If this be so, then the nigher we can come to it in curing, the more perfect is the process.

Curing by the formula, each hundred pounds of meat will, in the course of four days after packing, make about five quarts of brine, showing that *meat parts with its juice* (albumen) *as a first step in the process of curing.* This enables us to account, rationally, for the hard, junk-like character of the lean, both of pork and beef, when cured in common pickle, (strong salt and water.) A small portion only of its juices thus extracted and mingled with the brine in which it is immersed is taken back into the meat whence it came and where it belongs—its place being mainly supplied by the hard mineral. We use the same formula for curing beef, also, excepting that we allow only half the quantity of sugar.

I, and my brother farmers generally, use salted meats the year round. Independent, then, of all commercial considerations, the curing is a matter of universal interest among us. The fat broadside of a hog, cured with pure coarse salt and strong pickle, may be safely left to take what it needs, and it will take no more. But not so with the *lean*—with hams, shoulders, and beef; their good flavor is mainly destroyed, their nutritive qualities materially impaired, and their value as food in both ways diminished. Let the farmer, then, take the little extra pains required by the above formula, and he will find himself paid ten-fold in well-preserved, palatable, nutritious food; and there is no man in the world who more needs such food or who better deserves it.

JOHN McDONALD.

Hon. THOMAS EWBANK,
Commissioner of Patents.

UPPER PITTSGROVE, SALEM COUNTY, NEW JERSEY.

SIR: Your Circular of inquiries was handed me by my father a few days since, accompanied with the request that I would reply to it. Therefore, in accordance with the request contained therein, I herewith proceed to transmit you what little information I possess in relation to the condition of agriculture in our portion of the State. My reply must necessarily be confined to but a few of your inquiries, as the cultivation of many of the articles mentioned is almost entirely unknown in this district.

The condition of agriculture is rapidly advancing, and the spirit of improvement is evidently abroad. The farmer, of late years, has become awakened to the importance attached to this branch of national industry. A society for the promotion of agriculture, and other industrial interests, has been established in our community, under the name and title of the "Salem County Agricultural Society." Scarcely two years have elapsed since the practicability of establishing something of this order was first suggested by a number of our most enterprising farmers; and the consequence has been, during that period, a goodly number of members have been enlisted in its cause. The society, therefore, having been organized under these favorable auspices, has proceeded thus far with surprising success, and at its first annual exhibition, held October 3, 1850, it surpassed the most sanguine expectations of all who gave it a visit—thus proving that perseverance in this most noble and exalted cause will in a very short period enable our portion of "little Jersey" to stand on a basis of equality with any State in our Union.

With these preliminary remarks, I will proceed to answer, as briefly as possible, your inquiries in regard to our great staples—wheat, Indian corn, &c. There

has been a great increase in the production of these articles within the last ten years, both in the quantity raised per acre and in the amount of land cultivated.

The variety of wheat most cultivated in our locality at present is the Mediterranean. Formerly, the white smooth-head was considered to yield more to the acre than any other; but upon the introduction of the Mediterranean, it was almost entirely abandoned. This species will produce from 15 to 25 bushels per acre; average, 20 bushels, should the season not prove unfavorable. Placing the average, therefore, at 20 bushels to the acre, which may be safely relied on in an ordinary season—the ground having been judiciously prepared and seeded—the cost of production, valuing the land at $55 per acre, I estimate as follows:

Interest of $55 at six per cent.	$3 30
Ploughing twice	2 00
Harrowing thoroughly	40
One and a half bushel of seed, at $1 25 per bushel	1 87½
Harvesting	75
Threshing and cleaning	1 25
Drilling in	50
Cost of manure, with expense of manuring	6 00
	16 07½

The average product having been placed at 20 bushels per acre, I make the the cost of raising one bushel to be a fraction over 80 cents. This is a pretty correct calculation. We generally finish seeding before the 1st of November, and harvest about the 1st of the following July. You will perceive, in my estimate of the cost of production, that the quantity of seed used to the acre is one and a half bushel. If the wheat is drilled in, this quantity is sufficient; but where the grain is sown broadcast a little more is required, as many of the seeds cannot be covered, and must be left exposed upon the surface either to perish or to be picked up by the fowls of the air.

The rotation of crops is different among different farmers, and even the same farmer frequently adopts different systems—sometimes preferring a crop of oats after corn. The oats having been harvested, the ground is prepared for wheat, which latter is succeded by grass, (generally by timothy and clover combined,) which having been cut two years in succession in its turn, the sward is again broken up for corn. At other times, after the corn has been sufficiently "tended," grass is sown, which, when sufficiently advanced for the purpose, is turned under, as a green manure for a wheat crop. Many turn under grass of two years' standing, and sow with wheat. This plan of "green manuring," as it is styled, from numerous experiments performed in this county, appears to succeed admirably. Good wheat will sell readily in our community at $1 12½ to $1 25 per bushel, at almost any season of the year.

Corn.—The average product of this staple may be stated at 45 bushels per acre—many farms yielding from 60 to 90 bushels to the acre. The cost of production is as follows:

Interest of $55 at six per cent.	$3 30
Ploughing once	1 25
Harrowing	25
Preparing and planting	75
Cultivating	1 75
Manure and its application	4 17
Husking and threshing	1 12½
	12 59½

Cost of production, per bushel, 28 cents. In making the estimate I allow $4 17 for manuring, as that is one-third the cost of ten loads of marl applied to the grass which preceded the corn. The value of the fodder will more than meet any deficiencies I may have made in the calculation. Upon the whole, I think that 28 cents per bushel as the cost of production may be considered a safe estimate. Price of corn in 1850, 65 cents per bushel.

Oats.—In regard to this crop I have but a word to say. The average yield is about 25 bushels per acre; quantity of seed used, two bushels.

Hay.—Clover and timothy combined form our best hay. These grasses are sown in the quantities of four quarts of clover and two of timothy seed to the acre. After a good dressing with our best and most valuable fertilizer, *marl*, we may depend upon cutting at least two tons of first-rate hay per acre; and, in numerous instances, an acre will yield a burden of two and a half, three, and sometimes even four tons. This crop depends almost entirely upon having sufficient moisture in the soil and a good coating of marl. The effects of the marl will show to the very inch for several years after its application. In speaking of manures I shall say a few words on this most valuable fertilizer.

The cost of growing hay per ton is very nearly as follows:

Interest of $55 at six per cent	$3 30
Ten loads of marl, at $1 25 per load, $12 50; one-third of which is	4 17
Cost of seed and seeding	1 00
Cutting and making	2 00
	10 47

Cost of growing, per ton, $5 23½. The cost of making the first crop of hay is $12 50, two-thirds of which I allow for the two crops of grass, and the remaining third for the crop of corn following. This is about a fair division of the cost of marl used. Its effects will continue for years.

Sheep and Wool.—Is wool-growing profitable? The following calculation will show for itself. The cost of rearing 100 sheep is about $87 50 per annum. Thus:

Wintering, per head, 62½ cents	$62 50
Summer pasturing, per head, 25 cents	25 00
Whole cost of 100 sheep per annum	87 50
Average quantity of wool produced per head, two and a half pounds, making 250 pounds; value per pound at 31 cents	$77 50
Seventy-five lambs, at $1 50 per head	112 50
Value of manure manufactured	25 00
	215 00
Deducting the cost of rearing	87 50
We have clear profit	127 50

Root Crops are very little cultivated by our farmers, except a sufficient quantity for their own consumption. The average yield per acre of turnips is probably somewhere between 300 and 400 bushels.

Irish Potatoes.—Average yield per acre, 150 bushels. The disease so much complained of around us seldom affects this crop in our locality to any great extent. The reason why, I am unable to account for. May not this disease depend upon some principle existing in the atmosphere deleterious to the proper respiration nutrition of the plant? I merely make the suggestion.

The cost of production is about 18 cents per bushel. The mercers are considered by many to be the most profitable variety. However, different opinions exist in regard to this.

Manures.—I desire to say a few words concerning guano and marl. These two materials may be denominated, emphatically, the "farmer's gold dust." Either of them is decidedly a very powerful fertilizer, and it is almost impossible to make a preference between them. Guano, I think, is rather more powerful, and of course superior in its primary effects; but its impression is not near as permanent as that of marl. However, we possess at present the advantages of obtaining both, and consequently can apply each in accordance with our opinion as to the most judicious manner. Their right application to crops is of the utmost importance. Guano we generally apply for a wheat crop; it is, however, equally as profitable upon corn. But to wheat it appears to be admirably adapted, producing the most luxuriant straw, well filled with the largest and plumpest grains. After the ground has been duly prepared, the guano is sown broadcast, in the quantity of about 300 pounds to the acre, previous to seeding. Marl is best adapted to grass. Applied in the quantity of about 250 bushels (or ten loads) to the acre, it will produce a most luxuriant burden. It is evident, from the long use of this fertilizer, that it cannot be surpassed by any other manure. It should be applied during the winter season, evenly spread over the young grass, in the quantity above mentioned. Its fertilizing principle evidently consists of potash, as will be seen from the following analysis of a specimen taken from a pit near Woodstown. The specimen consists of green sand, clay, and a trace of carbonate of lime. Thus:

One hundred parts afford—

Green sand - - - - - -	88.28
Clay - - - - - -	11.72
Carbonate of lime, (a trace.)	
	100.00

From a number of analyses of green sand, selected from different localities throughout the State, it would seem that the mineral is not quite uniform in its composition, but exhibits slight variations in the proportions of its principal constituents. The constituents of the green sand, of the specimen above referred to, are as follow:

Compositions, one hundred parts—

Silica - - - - - -	48.45
Alumina - - - - -	6.30
Protoxide of iron - - - -	24.31
Potash - - - - - -	12.01
Lime, (a trace.)	
Water - - - - - -	8.40
	99.47

For further information in regard to this fertilizer, I would refer the reader to the "Final Report on the Geology of New Jersey, by Henry D. Rogers;" (page 200.)

Your most humble servant,

M. JOHNSON, M. D.

Hon. THOMAS EWBANK,
Commissioner of Patents.

WHEELING, OHIO COUNTY, VA., *December*, 1850.

SIR: I received a Circular from the Patent Office some time since, and, being desirous at all times of communicating whatever information I may possess, whether new or practical, upon any subject connected with the cul-

tivation of the soil, or rearing live stock, shall endeavor to answer, in a discursive manner, some of the interrogatories in relation to *Sheep husbandry.*

The leading question under the head of sheep and wool—"Is wool-growing profitable?"—can only refer to this description of stock when well managed, receiving the light but necessary attentions during the grass seasons usually bestowed upon them by flock masters, and the preparation of ample supplies of food for their consumption during the winter months.

Sheep, like all other domestic animals, remunerate their owners just in proportion to the care that is bestowed upon them, and the judicious application of the food they consume, and its adaptation to their necessities. In endeavoring to obtain as large a supply of wool as is practicable, regard should be had to good condition. High feeding on grain should at the same time be avoided, as it renders the wool harsh, and the yield is not in proportion to the cost.

The merinos or Saxon sheep are generally kept in this section of country, and are preferred to the coarse-woolled sheep. They bear confinement in large flocks better than any other breed. They also produce as much wool in proportion to what they eat. Their food is the same; nor are they more dainty in their appetites than the native stock. Their mutton, when fat, is excellent, being tender, juicy, and of fine flavor, when well cooked. This race of sheep, consequently, from the known value and extensive consumption and high price of their wool, together with the good qualities of their mutton, highly recommend themselves to all classes of farmers. They are also peculiarly fitted for the improvement of lands injured by cultivation in the southern States; and, from experiments recently made in the interior of Virginia, it is no longer to be questioned that they will thrive and be profitable in such situations.

The mountain or rolling lands of the southern States will doubtless in a short time yield a handsome revenue in wool, as a shepherd with his dog could keep a large flock of sheep during the growing season at comparatively little expense. Such has been the custom with the wool-growers of this vicinity for many years, the sheep being brought home for the winter.

The prepossessing appearance of sheep farms is much owing to their destroying the weeds and bushes, and to the beautiful sward produced by the minute and equal distribution of their manure over its surface.

Sheep will fertilize, more readily than any other stock, the hill tops, from their habits of seeking the highest land to lie on at night.

There are, however, some other points worthy of mention in connexion with this subject. Merino or Saxon sheep are more readily confined in fields than the native stock, and require much less outlay in fencing than is necessary upon farms where horses or cattle are kept. This, where timber is scarce upon cultivated farms, is a very important consideration.

In this section there are immense quantities of manure made by feeding the sheep durin the winter season under barns or other shelters, which are well littered with straw, both for the cleanliness and health of the sheep and for increasing the amount of manure. It is left under shelter until the following summer or fall, when it is hauled out upon the grass-lands designed for corn the next season, or spread and ploughed under for wheat when necessary, or to top-dress meadows. This manure is of course very strong from the little exposure to which it has been subjected, and, being dry, is easily hauled out.

The winter feed of sheep in this region, embracing Ohio and Brooke counties, in Virginia, and in the adjoining counties of Ohio and Pennsylvania, where hundreds of thousands of sheep are kept, consists of hay, sheaf oats, corn, and corn-fodder, and what grass may remain upon the fields after the proper grazing season is over.

These sheep certainly pay, or other stock would soon be substituted in heir stead, as I know of no people who better understand their true interests than those mentioned.

Cattle do well here, and they could soon be introduced more extensively, as this is a fine region for grass; spear grass and white clover being indigenous to it. Timothy and red clover also grow to great perfection.

It is generally believed that a steer costs as much during the year as ten sheep. The sheep produce wool worth from ten to twelve dollars and a half. The profit on cattle is not so great; if it is, I have not found it out. This is the annual yield of the sheep in wool, independent of the increase, which, in a flock of one-half breeding ewes, would be fully 50 cents per head more.

It appears, then, that 100 sheep, 50 of which are breeding ewes, will produce from $100 to $125 for the wool, and 50 cents per head for the increase, (it being about from 75 to 90 in large, and should be greater in small flocks,) or near that sum, valuing the lambs at one dollar per head. This is not, however, a fair estimate of the best flocks that furnish bucks and choice ewes for the improvement of other flocks. The annual sales of stock in such instances will very considerably increase the above estimates.

There being no sheep kept here the entire year on hay, I am unable to state how much wool a ton of hay will produce. It is usual to feed from seven to ten tons of hay per hundred, with some grain. The amount of feed varies with the severity of the winter.

The Saxon sheep spoken of are not the delicate animals some writers of the present day would have us believe, but are as hardy as any stock of sheep which have as yet been introduced here, and are remarkable for the quality of their wool, and the good property, so essential, of producing animals equal, if not superior to themselves. Some samples of wool taken from my Saxon sheep, just before shearing this summer, were handed to Mr. P. A. Browne by Messrs Houston & Robinson, of Philadelphia. The samples grade as below:

Unwashed wool.	Grown bucks,	No. 1 - - -	1,250 (inch.)
		No. 2 - - -	1,875
	Young bucks,	No. 1 - - -	1,850
		No. 2 - - -	2,186
		No. 3 - - -	2,186
	Ewes,	No. 1 - - - -	1,875
		No. 2 - - - -	2,186
		No. 3 - - - -	2,186
Washed wool.	Ewes,	Nos. 1 and 2 - - -	2,186
		No. 3 - - - -	1,875

The wool-growing interest will be much benefited by Mr. Browne's various examinations,* as they can more readily tell the relative value of their sheep, and where to procure good crosses.

The preceding remarks upon the subject of sheep and wool you can use as you think proper.

Yours, respectfully,

H. W. CHAPLINE.

Hon. THOMAS EWBANK,
Commissioner of Patents.

LAFAYETTE, INDIANA, *December* 16, 1850.

SIR: In answer to your communication, I would say that I never wrote a piece for the press in my life, and you will please take the substance of my communication, which I will endeavor to make intelligible.

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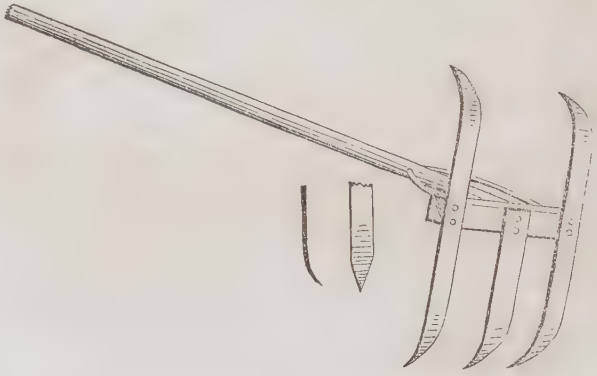
* See Plough, Loom, and Anvil for March and May, 1850.

I will, in the first place, give my mode of transplanting young orchard trees I lay off the ground, and put a small stake where each tree is to stand. I then cut a forked stick of sufficient size, and cut the prongs so that they will measure three feet from point to point. I set one prong where the stake stands, and strike a circle with the other, which will be six feet in diameter, to spade by. I lay the first spit around the hole. If the second spit is good, I merely reverse it; if not, I throw it away, and replace it with good soil. In setting the tree, I raise a little mound in the centre, pressing the tree firmly on the mound, one holding it straight while the other fills up the hole. I do not throw the soil upon the roots in a mass, but carefully press the earth around and into every crevice of each layer of roots, placing the roots, with the fingers, as near as may be, in the same position, as respects divergence, in which they originally stood. I then press the whole firmly with the foot, except three or four inches on the top, which should be left loose and concave to retain and absorb the rain. This completes the setting.

I have next to speak of the after-culture. But I will first describe an implement which I use for that purpose, and which I originally invented for garden culture, but found admirably adapted to the latter use. It simply consists of three spring-steel blades, each one and a fourth inch wide, two of them 18 inches long, one 10 inches long. They are set in a wooden bar, or head, eight inches long and two inches square, fastened with two screws in each blade; they should be two-inch screws. The two long blades are set at each end of the head; the short one in the middle; both ends of the long ones are curved, and one end only of the short one. To this a handle is attached similar to a rake handle. This implement is to be used by a motion similar to raking. It is not to dig or hoe. It can be used to advantage where the ground is too wet for any other tool, for it leaves it in a better condition to receive light and air, which are essential to vegetable growth. The use of the side with two prongs is to run astride of onions, beets, radishes, and all suitable things planted in rows, and also to work anything when the ground is too wet for the three-pronged side, which often happens.



The two small figures represent the front and edge of a tooth.

Some of my neighbors have tried to improve on it by fastening the blades to a thin iron head with rivets. But I prefer my original plan. It is lighter, and easier put in repair.

Thus prepared, I go over my newly set trees just before a rain, and mellow the ground from four to six inches deep, the size of the hole. I can thus go over 200 trees every hour with ease. If the rain should be very heavy, I go over them again as soon as the ground is sufficiently dry to break the crust formed by the rain, which is very detrimental to the growth of anything. Thus

I proceed until about the 15th of July. After that I leave the ground undisturbed; for, if continued, the trees would continue to grow until frost, and would be liable to be killed by the winter. If the weather should be dry, I go over my trees once a week, and mellow the ground as deep as I can each time. If wet, and the rains are heavy, I go over after each heavy rain and break the crust. Under the above treatment, there is no need of mulching, and they will make a much better growth than mulched trees. Some may think all this too much trouble. I have tried every way, and I now practise this way exclusively, and never intend to practise any other way.

A word on the position in which trees should be set: Some people are very particular to have a tree set in the same position in which it grew in the nursery. I never found any difference in that respect. But it is very important that some trees should stand in a certain position—a fact, I believe, which has not been noticed by writers on horticulture. A great many trees are crooked and curved in their stems. The crooks and curves incline to an angle of from 10 to 45 degrees. If these inclinations are set to the south, the intense rays of the summer sun scorch the sap. The sap, thus scorched, has an offensive smell, which attracts the borer, which soon reduces the whole south side of the tree to powder in these inclinations. Thus from 10 to 15 per cent., or more, of young orchard trees are destroyed, which might be prevented by observing the above rules.

A word about how nursery trees should be raised: Some nurserymen boast that all their trees are grafted in the root. The common practice is to graft or inoculate the trees from 4 to 12 inches from the ground. This may be the most convenient for the nurseryman. But this practice and root grafting are both wrong, unless for dwarfs. All kinds of trees should be grafted or inoculated where the head is to be formed, because seedling stocks are more hardy than the cultivated varieties; much more so, in general.

The thermometer, in 1843, stood a whole day (the day perfectly clear) at zero; the snow about ten inches deep, and the ground soft. The consequence was, that all my sweet cherry trees that were inoculated low were killed, while the seedling stocks were not injured. A great many large apple trees (root grafted) suffered the same fate; and so of all other fruits—proving the seedling stocks to be much hardier than the grafts. Sweet cherries should be highly worked in particular, they being more tender than any other hardy fruit. When the snow falls deep, and the ground is soft, it should be removed from around fruit-trees until the ground is frozen, to prevent the disaster that happened to me in 1843. The philosophy of it is this: When the snow is deep, and the ground is not frozen, a circulation of sap is kept up in the roots consequent from the warm bed of snow; this, meeting with a low temperature in the clear sunshine—the rays of the sun reflecting from the snow—raises a degree of heat in the focus of those rays to permit the sap to pass up four or five inches above the snow, which freezes in the absence of the sun; thus, the tree is killed as far as the reflection of the sun can reach Such trees as apple, peach, pear, plum, and sweet cherry, are generally killed all round. While the nurseryman continues thus to work his trees low, the farmer will continue to have vacancies in his orchard. If those who set new orchards will observe the above rules in selecting, setting, and after-culture, they will not have many vacancies to fill. The above mode of culture is peculiarly adapted to the first season; any kind of clean culture will answer afterwards. Let no one presume to continue it beyond the 15th of July; otherwise they may pay dearly for it the next winter. The above is all that is original with me.

Yours, respectfully,

CANADA FINK.

Hon. THOMAS EWBANK,
Commissioner of Patents.

NOTE.

Seeds ordered for the fall of 1852.

In consequence of the late period at which the foregoing Report is issued, an opportunity is afforded of inserting the following letter, that Congress and the agricultural community may know what measures have been taken to provide seeds for distribution the present fall, and what amount of the appropriation for agricultural statistics, &c., has been devoted to that object:

PATENT OFFICE, *September* 16, 1852.

SIR: I have to acknowledge the receipt of your letter of 14th inst., suggesting that I might consult with advantage the "Philadelphia Society for the Promotion of Agriculture" on the annual selection and distribution of seeds. To meet the wishes of agriculturists in this matter, is certainly the most direct mode of accomplishing the intentions of Congress in making the appropriation. Some seeds have been ordered from California, Brazil, Sicily, &c., amounting probably to one thousand dollars. *Two thousand dollars* remain for the purchase of American and foreign seeds; and to the most judicious expenditure of this sum I respectfully invite the attention of the Society. As the money is to be expended for the benefit of all the States, the variety of seeds should include some adapted to the climate of all, and such as will meet the expectations of planters. About four hundred packages will be required for members of Congress, heads of departments, &c., and about as many smaller ones for distribution from the office. These the office will address and forward through the mail. The remainder should be put up in packages, for societies and prominent farmers, and may be addressed by the Society and forwarded to the office to be franked. Thus the responsibility of the distribution, as well as of the selection, will be chiefly with the Society. As Col. Wilder, the president of the United States Agricultural Society, and other eminent agriculturists, are attending the Pomological and Horticultural Convention now holding in your city, I would respectfully suggest that they also be consulted. I need not say that the seed should be fresh, of the first qualities, and put up in the best manner. They should be ready for distribution from the office by the beginning, and not later than the middle, of February. Each package should have its contents printed on it, and each paper the name of the seed it contains. "Seeds from the United States Patent Office" should also be printed on every paper and package.

The purchase and preparation of these seeds are left with your Society, and the bill or bills, when approved by your Society or a committee, will be promptly paid by the office. If the Society approve the suggestion, the following words might be printed on each package: "Selected for the Patent Office by the Philadelphia Society for the Promotion of Agriculture."

ISAAC NEWTON, Esq.,
Philadelphia, Pennsylvania.

T. EWBANK.

Prong-horn Antelope . *Antilocapra americana* . Ord. Lib. 121.

Pacific Black tail Deer [*Cervus lewisii*, Peale] p. 118

C. Bürdsall Del. Washington

American Moose (*Alces americana.*) p. 112

Mountain Goat (*Capra Americana*, Blainv.) p.120

C.B. Graham, lith. Washington

Mountain Sheep or Bighorn. (*Ovis montana*, Desm.) p 123

T. Sinclair, Lith. Washington.

Musk Ox *ovibos moschatus* Blainv. | p. 121

Buffalo (*Bison americanus* . Gm.) p. 124

C. B. Graham, lith.

Barren Ground Reindeer (*Tranduis arcticus*, Rich.) Horns. p. 105

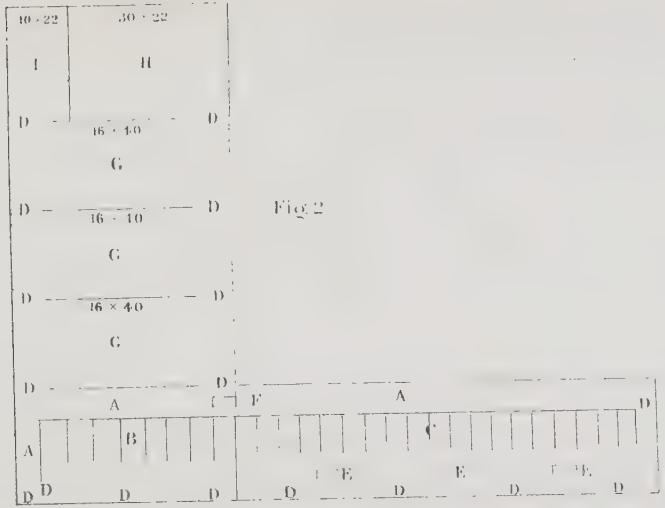

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Fig 2

Fig. 1